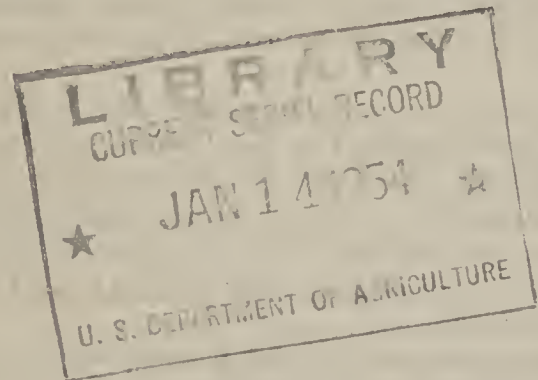


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Report of
**the Chief of the
Forest Service,
1953.**



1952/53

Grazing on the National Forests

UNITED STATES DEPARTMENT OF AGRICULTURE

UNITED STATES DEPARTMENT OF AGRICULTURE,
FOREST SERVICE,
Washington, D. C., September 15, 1953.

HON. EZRA TAFT BENSON,
Secretary of Agriculture.

DEAR MR. SECRETARY: This is a report of Forest Service activities during my first year as Chief and during the first months of a new national Administration.

The past year can be characterized as a year of change. Three factors—the changing status of the national forests, a new top team in the Forest Service, and a new national Administration—all spell change, not only for the past year but also for the years ahead.

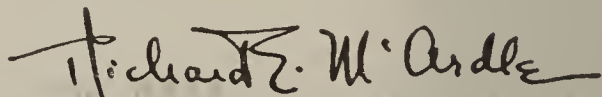
The national forests are becoming increasingly valuable properties subject to ever greater use. And their administrators are becoming subject to ever greater pressures. We welcome this change as part of the normal development of our economy and the normal increase in our population. The national forests are no longer hinterlands.

The strength of the Forest Service lies in its long-term career personnel, who are devoting their lives to public service. Yet the leaders of the Service—the Assistant Chiefs, the Regional Foresters, and the Directors of our regional forest and range experiment stations—are nearly all relatively new in their present assignments. All are professional men of competence and with long experience in the Forest Service.

This report to you is in three parts: (1) A brief summary of some of the major actions during the past year; (2) a review of the grazing policies and problems of the Forest Service which have been in the forefront of attention; and (3) a summary of the day-to-day accomplishments and activities of the Service in its three major fields of responsibility—administration of the national forests, cooperation in State and private forestry, and research.

Under my administration the Forest Service will continue to serve the American people in conservation. As Secretary James Wilson said in 1905, the national forests will “. . . be devoted to their most productive use for the permanent good of the whole people, and not for the temporary benefit of individuals or companies . . . local questions will be decided on local grounds . . . where conflicting interests must be reconciled, the question will always be decided from the standpoint of the greatest good of the greatest number in the long run.”

Sincerely,



RICHARD E. MCARDLE,
Chief, Forest Service.

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Report of the Chief of the Forest Service, 1953

MAJOR ACTIONS

The Forest Service engages in the following major activities: (1) The administration of 181 million acres of Federally owned land in 153 national forests; (2) cooperation with States and private owners in fire protection, tree planting, and forest management; and (3) forest, range, and watershed research through regional forest and range experiment stations and the forest products laboratory.

During the past year, the national forests have been the source of our most critical problems. This is to be expected and will continue to be so. It could hardly be otherwise, because the vast resources of the national forests affect the success or failure of countless business enterprises, and the economic and social well-being of countless thousands of American citizens and the communities in which they reside.

National-forest activities in the past year included supervising the cut of 5.16 billion board feet of timber and making some 22,000 new timber-sale contracts; grazing of some 1 million cattle and 3 million sheep under 23,500 permits; accommodating 33 million recreational visits, including 9 million visits from hunters and fishermen; administering 55,500 special-use permits for summer homes, resorts, telephone lines, water development, mineral leases, and other purposes; suppressing 12,000 forest fires, which burned 219,000 acres; planting 51,000 acres of forest land; reseeding 56,000 acres of range land; building 460 miles of roads; and maintaining 200,000 miles of existing roads and trails.

Following are some of the major policy actions of the past year.

1. Several administrative policy changes have been made or proposed with respect to grazing on the national forests. There has been progress toward legislation that would help livestock producers and, at the same time, safeguard the interests of all other national-forest users. These grazing policies and problems are discussed subsequently in more detail.

2. Consideration was given by the Congress to the possible need for revision of the mining laws as they affect the national forests. The Forest Service believes that discovery and utilization of the mineral resources underlying the national forests should be encouraged in every proper way; but it also believes some revision of present laws is needed to prevent unnecessary impairment of surface resources. Two congressional committees are currently studying the problem.

3. In timber management, a new policy has been developed for Federal sustained-yield units; timber-sale contract forms are undergoing important revisions, and methods of timber appraisal are under intensive study and review.

4. Positive and aggressive action is under way to minimize serious timber losses from insect epidemics in the Pacific Northwest and the Inland Empire.

5. The entire matter of Federal ownership of land has received much attention. New criteria have been adopted with respect to land exchanges and purchases. The Forest Service is intensively studying national-forest boundaries and purchase units, with a view to possible revisions.

6. An arrangement has been agreed upon between the Departments of Agriculture and the Interior which would settle the long-standing controversy over administration of certain national-forest timber lands in Oregon. In the meantime, disbursement to the State for the benefit of the concerned counties of 1.4 million dollars which has been held in escrow pending settlement of the controversy has been recommended to the Comptroller General. Upon final settlement, the counties will receive a substantial additional sum.

7. Organizationally, decision has been reached and progress made toward consolidation of 14 national forests and 2 regional forest and range experiment stations. Forest Service activities in Puerto Rico have been reorganized. The Insular forests, which for many years have been managed by the Forest Service, have been turned over to the Insular Government for administration, and an Insular Forester has been appointed. Forest Service participation in upstream flood-control surveys, flood-control action programs, and comprehensive river-basin studies has been reorganized and consolidated.

8. In research, a nationwide Forest Research Advisory Committee has been organized; coordination of Forest Service research with the Agricultural Research Administration has been improved; the research of the forest products laboratory and the regional forest experiment stations has been more closely integrated; and procedures have been developed which have greatly strengthened cooperative research with State agricultural experiment stations, forestry schools, and forest industry.

GRAZING ON THE NATIONAL FORESTS

Possibly no other phase of national-forest administration has been as difficult as grazing. A small but important segment of grazing permittees has been dissatisfied. Difficult problems of resource management have confronted our rangers and supervisors, and there appears to be considerable misunderstanding of departmental policy and facts of administration.

Periodically the administration of Federal grazing lands—both national forests and those under the administration of the Department of the Interior—has erupted into national issues which have required the attention of the Congress and Department heads. Because this situation prevails in 1953, I wish to report to you in some detail on national-forest grazing matters. I have not heretofore made a public statement on the grazing policies of the Forest Service nor the actions taken during the past year in an attempt to solve some of the major problems of range administration. It is my hope that this statement will clear up some misunderstandings and correct some false impressions.

As necessary background, I shall describe briefly the character and importance of national-forest range resources and the bare essentials of range administration and management. Emphasis will be on the major problems of range administration and the events of the past year pointing toward the solution of those problems.

RANGE RESOURCES

There are 104 national forests in the West comprising 138 million acres. Of this area, 44 percent, or about 61 million acres, is grazed by livestock. Most of the range is forested, much of it commercial timberland. All national-forest grazing lands, whether forested or open range, have important watershed values.

Types of vegetation differ widely because of extreme variations in elevation, climate, and soil. There are high-mountain subalpine grasslands and mountain meadows. Somewhat lower are the open-forest ranges of ponderosa pine and aspen. Still lower are the woodland ranges with a tree growth of pinyon pine, juniper, and oak. At still lower elevations are the open ranges of sagebrush-grass, the short-grass types, and the semidesert grasslands. The more dense timber stands of white pine, spruce, lodgepole pine, and Douglas-fir are relatively unimportant for grazing.

Western national forests have been grazed by domestic livestock ever since their establishment early in the 20th century. The same ranges were grazed for many years before the national forests were proclaimed.

Most western ranges became fully stocked in the late 1880's and early 1890's, a few in the 1870's—many years before the national forests were created. When placed in the national forests, many of the ranges were in deteriorated condition, not only as a result of past excessive grazing but also because of uncontrolled fires and other factors. Some of the range was plowed and cultivated to meet requirements of the homestead laws and later abandoned when found unsuited to farming. Demand for use of the range was great. To attempt to conserve forage was an invitation for others to come and get it. The memory of range wars between cattlemen and sheepmen was fresh. The destruction of range vegetation that already had occurred seriously reduced grazing capacity and watershed values.

Although progress had been made toward bringing grazing capacities and livestock numbers into balance on national-forest ranges, this progress was lost during World War I when livestock numbers in the West reached an all-time high.

Owing to the patriotic urge to produce as much meat and wool as possible, livestock increased on nearly all ranges. On national forests permitted cattle and horses increased 38 percent, from 1.6 million in 1914 to 2.2 million in 1918; and sheep and goats 12 percent, from 7.6 million to 8.5 million. Similar or even greater increases occurred on other public and private ranges.

Lower postwar prices for livestock, high costs of production, hard winters, and efforts to bring livestock numbers into balance with the forage supply brought about material reductions in both sheep and cattle on the national forests. Despite aggressive efforts to improve and manage the range, subsequent reductions in either livestock num-

bers or season of use have been necessary. The problem of bringing about a proper balance between livestock numbers and the forage supply constitutes a serious present-day problem in many parts of the West. This problem has been further accentuated in many areas by an increase in big game and accelerated demands for water and other national-forest resources.

About 1.1 million cattle and 3 million sheep graze western national forests, usually during the summer months under paid permit (table 1). These livestock are owned by some 20,000 permittees, who in fiscal year 1953 paid fees totaling 4.4 million dollars. In addition, over 52,000 head of livestock, primarily milk cows and work horses, were grazed without charge under regulations allowing free grazing to local settlers. Thus the grazing business on the national forests is a large one. It is one of the important uses of the national forests.

TABLE 1.—*Use of western national forests by domestic livestock and big-game grazing animals, stated years, 1908-52*

Calendar year	Domestic livestock			Big-game animal-unit-months ²
	Cattle and horses	Sheep and goats	Animal-unit-months ¹	
	<i>Thousand</i>	<i>Thousand</i>	<i>Thousand</i>	<i>Thousand</i>
1908-----	1, 382	7, 087	13, 952	-----
1913-----	1, 554	7, 868	15, 612	-----
1918-----	2, 230	8, 511	20, 365	-----
1923-----	1, 852	6, 711	17, 179	1, 170
1928-----	1, 436	6, 416	12, 672	1, 590
1933-----	1, 456	6, 169	12, 943	2, 230
1938-----	1, 301	5, 310	11, 062	2, 850
1943-----	1, 244	4, 542	9, 842	3, 410
1945-----	1, 245	3, 893	9, 136	3, 620
1947-----	1, 178	3, 405	8, 149	3, 740
1949-----	1, 140	3, 096	7, 645	3, 970
1951-----	1, 097	3, 016	7, 338	4, 430
1952-----	1, 105	3, 005	7, 332	4, 430

¹ Estimated 1908 to 1923, since animal-unit-months not reported prior to 1926.

² Big-game population estimates not available until 1921.

The number of national-forest grazing permittees is about 31½ percent of the total number of livestock growers in the West. Of the total beef cattle population in the Western States about 11 percent graze on national forests a part of the year. Of the total stock sheep, approximately 22 percent graze on national forests. The forage furnished by the national forests is about 7 percent of the total feed requirements of western livestock.

Although the numbers involved are relatively small, and the forage furnished is not great compared with total needs, national-forest grazing is very important to the stockmen permittees. This is especially so because the high-mountain national-forest summer ranges form an essential link in the chain of grazing use with the lower elevation spring, fall, and winter ranges and improved ranch property, which

provide feed during the remainder of the year. These lower ranges are usually Federal grazing districts, State lands, or privately owned. Thus the seasonal national-forest summer ranges hold a key position in the yearlong operations of many producers.

The agricultural economy of the West, which is based largely on irrigation and livestock production, is inseparably linked to national-forest ranges. This is true, not only because of the grazing use of these ranges, but also because they are primary water-yielding lands. In general, western agriculture depends on a pattern of land relationships wherein comparatively small areas of water-consuming lands are directly dependent on extensive tracts of water-yielding forest and range lands. The national forests of the West embrace the headwaters which furnish most of the flow of major western rivers and streams used for irrigation, waterpower, and domestic purposes. The future of the West depends on how well these water-yielding lands are managed.

Grazing on national forests of the East and South is of growing importance to the local agricultural economy, but the national forests of the East are too small in number and size for the grazing use ever to be of major importance in livestock production. About one-fourth of the 22 million acres of eastern national forests is grazed by domestic livestock. In 1952 about 2,800 permittees grazed 36,000 cattle, 1,400 sheep, and 800 hogs, mostly in the South and Southeast. There are problems of conflicts between grazing and timber production in these areas which are being studied but which have not yet been generally resolved.

The policy problems of the Forest Service with respect to grazing come almost entirely from the West; and this statement is directed exclusively to western conditions and problems.

RANGE ADMINISTRATION AND MANAGEMENT

By the Act of 1897 the Congress specified that the purposes of the national forests were to secure favorable conditions of waterflow and to furnish a continuous supply of timber. It also instructed the Secretary to regulate their "occupancy and use." Under this broad authority, production of water and timber are the two major purposes of the national forests, but grazing by livestock has always been recognized as an important use. Thus in 1905, at the time the Forest Service was created, the Secretary of Agriculture, James Wilson, wrote the Chief of the Forest Service:

You will see to it that the water, wood, and forage of the reserves are conserved and wisely used for the benefit of the home-builder first of all; upon whom depends the best permanent use of lands and resources alike. The continued prosperity of the agricultural, lumbering, mining and live-stock interests is directly dependent upon a permanent and accessible supply of water, wood, and forage, as well as upon the present and future use of these resources under businesslike regulations, enforced with promptness, effectiveness, and common sense.

The grazing regulations of the Department, the history of the administration of the national forests, Supreme Court decisions, and the various Appropriations Acts all provide a broad legislative and administrative base for recognition of grazing by livestock as a proper use of the national forests. This base was further strengthened by

the Granger-Thye Act of 1950. However, such grazing use must be integrated and coordinated with the multiple-use policy of management which recognizes water and timber production as paramount uses with equitable consideration for the interests of stockmen, recreationists, hunters and fishermen, and the general public.

The Department has traditionally fostered two policies in its administration of the grazing resources of the national forests:

(1) Proper stocking and improvement of the range resource to achieve desirable watershed conditions and sustained high-level production of forage. Over many years the Department has attempted to bring livestock numbers into balance with available forage. This is being done by building up forage production through reseeding, other range-improvement measures, and by better management. Where this is not sufficient, necessary adjustments to grazing capacity have been made in either numbers of permitted livestock or season of use.

(2) Equitable distribution of the grazing privileges to favor the medium and small rancher dependent on national-forest range; but with due consideration to the larger permittees.

Grazing Allotments and Permits

National-forest range lands are divided by the Forest Service into "allotments" or use units, which are simply areas of land specifically designated for grazing use by specified numbers of livestock. The size of allotments is based primarily on the number of livestock to be grazed but is affected also by accessibility, topography, availability of forage, stock water, and related factors. Nearly 10,000 allotments have been designated on western national forests. Most of these are grazed by only one kind of livestock, either cattle or sheep, although some are grazed by both. Allotments may be designated to be grazed by the livestock of a single permittee or in common with animals owned by other people in the community.

The privilege of grazing a certain number of livestock for a definite length of time is allocated by the Forest Service through issuance of grazing permits to qualified applicants. In order to qualify, a rancher has had to meet certain requirements prescribed under departmental regulations. First of all, he has to own ranch property. He also has to own his livestock. He has to need national-forest range to round out his yearlong feed supplies.

The demand for grazing on the national forests has always exceeded the supply. Therefore it has been necessary to establish rules to determine which stockmen would be given permits. When the national forests were established, the prior users were given preference in the issuance of permits. After that local settlers and ranchers living in and near the forests were next in line of priority. After several years of continuous use the permittees established what have become known as "preferences." Thus the general pattern of grazing use has been fairly well crystallized for a long period of time and has resulted in establishing a group of preferred applicants for use of national-forest range. In order to provide a reasonable degree of flexibility in business transactions between permittees, it has been

customary for the Government to transfer preferences from a permittee to a purchaser of his ranch property or permitted livestock. This has been the principal way in which new permittees have obtained grazing privileges on the national forests since the original allocation of permits to prior users.

However, where surplus range is available, the practice has been to allocate it first to existing small permittees and secondly to qualified new applicants. There has also been provision for reducing the number of livestock in larger permits to take care of the needs of small permittees and needy new applicants. This is known as "distribution," and has been one of the controversial issues for many years.

In order to avoid concentration of an undue share of the range in a few permits, so-called "upper limits" have been established above which existing permits ordinarily are not allowed to increase.

A rancher who wishes to obtain a grazing permit applies to the forest supervisor or ranger having supervision over the national forest where the rancher wishes to graze animals. If the applicant meets the necessary requirements and if range is available, he will be given a permit for a definite number and kind of livestock for a definite number of months upon payment of specified fees. Most permits run for 10 years. There also is provision for issuance of temporary permits.

The average grazing period is a little over 5 months each year for cattle and somewhat less than 3 months for sheep. Most of the permits are seasonal (mostly summer); but some, particularly in the Southwest, are yearlong.

Range Management

Forage is a renewable resource and responds to management, whether good or bad. On national forests, forage is recognized as a resource available for the production of livestock and big game. In management, the plan of action is to restore forage production on ranges which may be deteriorating and to maintain it on a sustained-yield basis both on those ranges and others already in satisfactory condition.

Four major interdependent phases are involved in the Forest Service range-management program. If properly harmonized with the findings of research and practical experience, the trend will be toward soil stabilization, sustained yield of the most valuable forage species, stabilized livestock operations, and maximum yields of meat and animal products. The four phases are:

(1) Inventory, survey, or allotment analysis. This is an assembly of facts and information on soil, forage production, condition and current trend of soil and forage, developments and improvements needed, relation of range use to other uses, and best season of use. The survey may indicate the need for additional study of any one of these items, but its main purpose is to provide information for management of the allotment.

(2) The management plan and its application. The management plan for an allotment is a product of the inventory and seasonal-use study, worked into a practical, usable system of grazing use. It is a guide to proper management, and its successful application

depends upon close cooperation between the stockman and forest officer. The plan sets up season of use, grazing capacity, and how livestock should be distributed. It may include a plan for alternate or rotational use of subunits within the allotment, a listing of existing and needed range improvements, and additional details.

(3) Field inspection and utilization determination. This also is a cooperative on-the-ground followup by the stockman and forest officer on the application of the plan and careful consideration of possible need for its revision as to ways and means of obtaining better distribution of livestock; rotation systems to insure greater value from forage; need for maintenance of improvements or additional installations; what can be done to correct sore spots on the range either through management or reseeding; and checks for degree of utilization.

(4) Condition and trend studies. These are needed as a followup to determine what is happening and will probably happen in the way of improvement or deterioration if the plan of management, inclusive of present rates of stocking and seasons of use, is continued. Forest Service range technicians have for years relied upon time-proven earmarks of improvement or deterioration which have been developed by research or experience. In order to check more closely and to provide for a more methodical record of what was happening on the range, especially in doubtful cases, the Forest Service in 1948 developed what is known as the "three-step method" for determining trend in condition. This is now being widely applied on western national-forest ranges and consists of (1) periodic collection of data at permanent benchmarks on representative parts of the ranges; (2) classification of condition and estimation of trend on the range unit; and (3) establishment of permanent photo-points.

The Forest Service depends on Department of Agriculture research for improved aids and guides to range management, revegetation, and noxious-weed control. Research findings are always subjected to pilot testing prior to wide-scale application to determine their practicability. Much research information developed by the Forest Service is being used by other land-administering agencies as well as by stockmen on private ranges.

MAJOR PROBLEMS OF RANGE ADMINISTRATION

The major grazing problems over the years between the Forest Service and grazing permittees may be grouped into six items: (1) Numbers of livestock and seasons of use; (2) distribution of grazing privileges; (3) transfer adjustments; (4) advisory boards and appeal procedures; (5) grazing fees; and (6) competition between big game and livestock.

Numbers of Livestock and Seasons of Use

The question of how many livestock should be allowed to graze the range always has been a major issue between permittees and the Forest Service. Reductions in numbers of livestock and seasons of use have always been and still are strongly resisted. Many ranges were being overgrazed when the national forests were established.

They were further damaged during the first World War, when the Government encouraged livestock production and the number permitted on the national forests reached an all-time high. Since then, and despite reseeding, other range improvements, and better management, substantial reductions have been necessary in order to conserve the range resource. On many national-forest ranges, numbers are now in balance with feed supplies. On others, grazing capacity and livestock use are not yet in balance.

The Forest Service does not rely on reductions in numbers of livestock as the only means of bringing grazing capacity and numbers of livestock into balance. Despite some feeling to the contrary, the Forest Service has aggressively pushed a range reseeding and improvement program. The Government has invested about \$3.5 million in reseeding national-forest ranges and another \$16.9 million in fence building, development of water places, stock driveways, and other range improvements. These are direct expenditures only and do not include costs of overhead or supervision. A complete range-development program for western national forests would cost approximately \$100 million. The history of appropriation requests shows that more funds have been requested repeatedly for this work than have been made available.

In addition, grazing permittees are encouraged to spend their own funds in developing national-forest range lands. During the past 10 years, some \$2.3 million of private funds has been spent in construction of range improvements and in revegetation. Additional private contributions worth about \$650,000 annually have been made in the form of material and labor (table 2).

TABLE 2.—*Construction of range improvements on western national forests, 1943-52*

Fiscal year	Kind of improvement				Cost all improvements		
	Range fences	Stock driveways	Water	Revegetation	Federal expenditures	Private (cooperative) expenditures	Total expenditures
	<i>Miles</i>	<i>Miles</i>	<i>Number</i>	<i>Acres</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
1943-----	230	15	350	8,099	11,424	185,938	197,362
1944-----	257	36	364	11,329	67,803	206,138	273,941
1945-----	308	14	336	7,291	54,203	214,139	268,342
1946-----	242	39	189	30,126	100,593	234,047	334,640
1947-----	449	40	348	33,837	447,242	192,179	639,421
1948-----	326	18	317	51,388	504,295	263,226	767,521
1949-----	442	26	322	67,144	797,417	367,145	1,164,562
1950-----	584	48	556	62,457	775,991	477,600	1,253,591
1951-----	319	16	240	55,033	836,532	111,699	948,231
1952-----	245	6	157	55,453	847,403	50,188	897,591
10-year total---	3,400	258	3,179	382,153	4,442,903	¹ 2,302,299	6,745,202

¹ In addition to the private cooperative expenditures shown, permittees on western national forests in recent years have made contributions in labor, materials, etc., toward both construction and maintenance of range improvements, averaging about \$650,000 annually.

Where grazing capacities of the national forests are thus increased by expenditure of private funds, the permittees making the investment are given reasonable assurance that the benefits from such expenditure will accrue to them. A revised policy recently adopted is designed to give added assurance.

Distribution of Grazing Privileges

Range forage on the national forests is a public resource. The Department has a responsibility for the development of equitable rules and regulations and for their fair application in deciding who will get the use of this public resource. Because national forests are public property, the Government must retain the right of decision as to who is privileged to use that property.

Even though the Government's right of "distribution" is seldom exercised, it is a basic matter of principle that the Government retain this right. Some stockmen have felt that, because of the demand for national-forest grazing privileges, the Government should be prohibited from awarding future privileges to any but present grazing permittees, or persons of their selection. This has been a major issue—not of practice, but of principle.

In the past, distribution rights have been exercised occasionally by the Government to award grazing privileges to new settlers and to applicants who have had insufficient range to support a small ranch. As the West has become more settled and stabilized, there has been less and less need for distribution. This is recognized in a recently announced proposal to modify policies covering distribution.

During the 13-year period 1927–39 detailed records of distribution adjustments were kept. In each of these years, with one exception, only a fraction of 1 percent of grazing permits and permitted livestock were affected by distribution (table 3). Since 1939 there have been practically no such adjustments.

TABLE 3.—*Grazing permits and livestock affected by reductions for distribution on western national forests, 1927–39*

Calendar year	Cattle and horses				Sheep and goats			
	Permits affected		Livestock affected		Permits affected		Livestock affected	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1927-----	5	0. 02	80	0. 01	-----	-----	-----	-----
1928-----	20	. 10	1, 050	. 07	1	0. 02	1, 388	0. 02
1929-----	11	. 06	874	. 06	4	. 06	816	. 01
1930-----	137	. 69	3, 835	. 28	22	. 34	19, 034	. 28
1931-----	59	. 30	1, 008	. 07	6	. 09	5, 930	. 09
1932-----	89	. 44	985	. 07	4	. 06	2, 555	. 04
1933-----	38	. 19	881	. 06	4	. 07	2, 910	. 05
1934-----	36	. 18	1, 279	. 09	15	. 25	9, 180	. 15
1935-----	1, 086	5. 31	15, 500	1. 15	522	8. 69	100,423	1. 75
1936-----	45	. 22	715	. 05	11	. 19	5, 063	. 09
1937-----	15	. 08	551	. 04	9	. 16	3, 404	. 06
1938-----	17	. 09	472	. 04	5	. 09	2, 675	. 05
1939-----	1	. 01	22	. 002	-----	-----	-----	-----

Detailed records not kept on distribution reductions before 1927 or after 1939. Practically no distribution reductions have been made since 1939.

Associated with the question of distribution of the grazing privilege is that of stability of tenure once the privilege is granted. Statements have been made implying insecurity of tenure and consequent economic risk to the permittee.

The rarity of distribution adjustments is one evidence of stability. The substantially higher premium paid for ranches or permitted livestock with national-forest grazing privileges is evidence of both (1) the low risk of distribution and (2) the high degree of stability of a national-forest permit.

Of all grazing permits on western national forests, about 40 percent have been held by the same family for more than 30 years; over half for more than 20 years; nearly three-fourths for more than 10 years; and about one-fourth for 10 years or less (table 4).

TABLE 4.—*Permits existing on western national forests as of 1952 which had been in same family for varying periods of years*

Permit period	Cattle permits		Sheep permits		Total permits	
	Number	Percent	Number	Percent	Number	Percent
All permits.....	¹ 15, 334	100	¹ 2, 444	100	¹ 17, 778	100
Period in same family:						
10 years or less.....	4, 397	28. 7	675	27. 6	5, 072	28. 5
More than 10 years.....	10, 937	71. 3	1, 769	72. 4	12, 706	71. 5
More than 20 years.....	8, 395	54. 7	1, 251	51. 2	9, 646	54. 3
More than 30 years.....	6, 139	40. 0	862	35. 3	7, 001	39. 4

¹ Does not include packer permits and small special-use pasture permits.

Furthermore, most permits in the 10-year-or-less category are so classified because of recent sales of ranch property. Actually, most such permits have been in effect for the same ranch or permitted livestock for considerably more than 10 years.

Transfer Adjustments

Transfer adjustments mean reductions in numbers of permitted livestock or length of grazing season at the time of transfer of grazing preference from one party to another, usually at the time of sale of the base ranch property or permitted livestock. Transfer adjustments may be made for either conservation of the range or for further distribution of the grazing privilege.

Some grazing permittees and others have felt that the Forest Service automatically reduces the number of permitted livestock whenever a transfer of preference occurs. The facts are that in the past 5 years, 1948–52, about 6 percent of the 19,000-odd paid permits annually were involved in transfer cases. Reductions were made in 44 percent of these transfer cases or an average of 467 each year (table 5). Of the transfer reductions, only 3 were for distribution and only 28 cattle were involved. All the rest were for range protection or conservation. In terms of livestock less than 1 percent of permitted numbers were affected during the 5-year period.

Some of these reductions at time of transfer have been strongly protested and are the source of the impression that reductions are auto-

matic at time of transfer of preference. A revised policy, tentatively approved and now under consideration by the livestock industry, would help to prevent further misunderstandings on this point by providing that reductions would be made as and when needed without relation to transfer of grazing privileges.

TABLE 5.—*Transfer cases and reductions in numbers of livestock incident to transfer occurring on western national forests, 1948-52*

Year	Paid permits	Transfer cases	Ratio of transfer cases to paid permits	Transfer cases in which reductions were made	Ratio of transfer cases involving reductions to all transfer cases	Reductions in numbers of livestock incident to transfer cases	
						Cattle and horses	Sheep and goats
	<i>Number</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Number</i>
1948-----	20, 177	1, 196	6	661	55	6, 851	33, 892
1949-----	19, 634	1, 029	5	434	42	5, 951	22, 009
1950-----	18, 481	1, 092	6	461	42	5, 878	26, 532
1951-----	18, 390	1, 184	6	460	39	5, 946	21, 642
1952-----	19, 550	822	4	321	39	5, 041	4, 516
Total-----	96, 232	5, 323	6	2, 337	44	29, 667	108, 591
5-year average-----	19, 246	1, 065	6	467	44	5, 933	21, 718

Reductions at time of transfer are sometimes strongly protested because it may be to the substantial financial advantage of the permit holder not to have any reduction made in the preference at the time he sells his base property or permitted livestock. The purchaser, and prospective transferee of the grazing preference, customarily pays an extra premium to the permit holder in the expectation of having the latter's national-forest preference transferred to him. Since this premium may amount to several hundred dollars per head for cattle, the seller naturally opposes any reduction in the preference.

Advisory Boards and Appeal Procedures

The Forest Service has always encouraged the formation of local grazing associations and advisory boards through which permittees could express collectively their views and recommendations regarding management policies. Over the years more than 800 such boards and associations have been organized. These boards are actively functioning today. The Granger-Thye Act of 1950 gave statutory recognition to grazing advisory boards, established the procedures by which the boards shall be constituted and elected, and specified their functions.

When a grazing permittee is dissatisfied regarding an administrative decision affecting him, he can appeal to the immediate superior of the officer by whom the decision was rendered. Thus he can appeal from the decision of the forest ranger to the forest supervisor, thence to the regional forester, to the Chief of the Forest Service, and to the Secretary of Agriculture.

In lieu of this procedure the permittee may, if he desires, request to have his case heard by the appropriate grazing advisory board. If he is not satisfied with the board's recommendations to the forest

supervisor, or the latter's action on the board's recommendation, he may then appeal through regular channels to higher levels.

There is also a National Forest Advisory Board of Appeals made up of qualified Department employees outside the Forest Service to advise the Secretary on appeals from decisions of the Chief of the Forest Service. Upon request of the appellant, and prior to decision by the Secretary, the appeal is referred to this board, which considers the case on its merits and then makes its recommendations.

This administrative appeal process appears to be functioning satisfactorily. Every appeal is given the most careful consideration. Informal hearings and field examinations are common.

In the 33 years, 1920-52, there were 1,195 appeals from ranger to forest supervisor, of which 271 were wholly or partly reversed (table 6). Appeals to higher levels of administration were progressively fewer. Reversals decreased from about 22 to 8 percent. There were 973 appeals from forest supervisor to regional forester of which 250 were reversed; 303 from regional forester to the Chief with 37 of these reversed; and 83 from Chief to the Secretary of Agriculture with 7 reversals.

Because most appeals deal with numbers of livestock or seasons of use, it is significant that during the same 33-year period when there were about 1,200 appeals to forest supervisors, some 84,000 administrative decisions on these matters were made without appeal.

Under the present appeals process, decisions of the Secretary of Agriculture are final, unless the appellant wishes to appeal to the courts on the basis of violation of law or arbitrary or capricious action. This recourse has always been open to him.

TABLE 6.—*Formal grazing appeals on western national forests, 1920-52*

Calendar year	Number of decisions not appealed ¹	Ranger to Supervisor		Supervisor to Regional Forester		Regional Forester to Chief, Forest Service		Chief, Forest Service to Secretary of Agriculture	
		Number of appeals	Number appeals reversed in whole or part	Number of appeals	Number appeals reversed in whole or part	Number of appeals	Number appeals reversed in whole or part	Number of appeals	Number appeals reversed in whole or part
1920-----	2, 384	16	6	30	16	10	2	0	0
1921-25----	14, 361	98	18	73	34	50	6	17	2
1926-30----	11, 517	112	17	120	26	40	2	14	0
1931-35----	13, 324	197	31	164	48	44	3	8	0
1936-40----	12, 063	196	59	164	26	32	3	7	1
1941-45----	12, 766	198	53	130	21	43	5	4	0
1946-50----	13, 046	293	60	220	49	67	8	31	?
1951-----	2, 285	51	16	26	2	13	6	1	1
1952-----	2, 304	34	11	41	28	4	2	1	0
Total-----	84, 050	1, 195	271	973	250	303	37	83	7

¹ Confined to decisions made by ranger or supervisor relating to numbers of livestock and seasons of use.

Grazing Fees

The privilege of grazing on the national forests is allocated by the Forest Service to qualified applicants. Forage is not sold to the high-

est bidder, as is timber. In that fact alone lies part of the reason for permittee resistance with respect to necessary reductions in permitted livestock and grazing fees. The historical reason for allocation rather than sale to the highest bidder stems from the early land policy of the Congress to encourage the settler and small rancher, as part of western development.

National-forest grazing fees are derived from a base fee which was put into effect in 1931. This base fee was determined after lengthy study by stockmen and Department officials, comparing the value of national-forest range with values of comparable leased private, State, and other Federal range. By administrative decision and after conferences with representatives of the livestock industry, the base fee was set considerably lower than amounts paid for comparable private range. Grazing fees for each year are determined by adjusting the base fee according to annual fluctuations in the market price of beef cattle and lambs, as reported by the Bureau of Agricultural Economics.

For 1953 the average monthly fee per head is 54 cents for cattle and 11¾ cents for sheep (table 7). This is substantially lower than the rate paid for comparable private range, but substantially higher than that for Bureau of Land Management range and most State-leased land.

TABLE 7.—*Grazing fees and receipts from grazing on national forests, 1933-53*

Calendar year	Average monthly fee per head		Total grazing receipts (fiscal year)
	Cattle	Sheep	
	<i>Cents</i>	<i>Cents</i>	<i>Dollars</i>
1933-----	9. 05	2. 05	1, 498, 209
1934-----	7. 51	2. 385	1, 358, 688
1935-----	8. 04	2. 71	1, 151, 153
1936-----	13. 05	3. 36	1, 441, 493
1937-----	12. 55	3. 66	1, 580, 345
1938-----	14. 98	4. 24	1, 696, 457
1939-----	13. 4	3. 3	1, 573, 912
1940-----	14. 89	3. 68	1, 463, 127
1941-----	15. 97	3. 85	1, 429, 091
1942-----	18. 9	4. 6	1, 595, 126
1943-----	23. 0	5. 5	1, 973, 233
1944-----	26. 0	6. 25	2, 458, 946
1945-----	24. 8	6. 03	2, 158, 626
1946-----	27. 0	6. 25	2, 059, 676
1947-----	31. 0	7. 5	2, 293, 773
1948-----	40. 0	10. 0	2, 898, 037
1949-----	49. 0	11. 0	3, 275, 964
1950-----	42. 0	10. 75	3, 385, 004
1951-----	51. 0	12. 25	4, 165, 573
1952-----	64. 0	15. 25	5, 022, 654
1953-----	54. 0	11. 75	4, 415, 862

Total grazing receipts reached an all-time high of over \$5,000,000 in 1952, but were still less than 10 percent of revenues from timber sales.

It is frequently pointed out by stockmen who are not permittees, as well as by members of Congress, that the lowness of national-forest grazing fees constitutes a substantial Federal subsidy to the permittees. This is one reason why ranches which have grazing privileges on the national forests command a premium when sold. If national-forest fees were equal to going commercial rates, the premiums purchasers would be willing to pay would disappear or be greatly reduced, and revenues to the Government would substantially increase.

Different principles are now followed in the establishment of grazing fees on the national forests and on the Federal grazing districts administered by the Department of the Interior. On the national forests, fees are geared to both the value of the forage and annual market fluctuations in livestock prices. On the Federal grazing districts fees are geared primarily to the cost of range administration and are not adjusted annually. On lands administered by the Bureau of Indian Affairs, the usual practice is to award grazing privileges on a competitive bid basis.

Grazing fees have been in controversy in the past and doubtless will be again. But at present they are not a major issue.

Competition Between Big Game and Livestock

Big-game grazing use has about doubled on the national forests in the past 20 years (table 1). Feeding habits of these animals differ from domestic livestock, and they tend to frequent rougher country and more timbered ranges which are less favored by domestic livestock. Nevertheless, there is competition in some areas between big-game grazing animals and domestic livestock for national-forest forage. This is true, especially where both use the same range and where numbers are out of balance with the forage supply.

When big-game populations were at low ebb during the early 1920's, positive steps were taken by the States to build up big-game numbers. These were so successful that in many places overpopulation of game animals resulted. But public opinion was slow to accept this, and State authorities have frequently been delayed in getting the necessary authority to apply control measures. There is close cooperation between the States and the Forest Service, and progress is being made in reducing problem herds.

Big game is an important national-forest resource, and sportsmen are an important group of national-forest users. Competition between the big game and domestic livestock cannot be entirely eliminated. Where such conflicting interests are involved, the best solution lies in application of the long-standing multiple-use management principle of the national forests. This principle recognizes that each use is proper, and strives to maintain as desirable a balance as possible between the two.

SUMMARY OF EVENTS OF PAST YEAR

Changes in Administrative Policy

1. *Increased grazing capacity, resulting from range improvement work financed by the permittee.*—The purpose of this policy change is to give permittees greater assurance that they will receive the benefit from range improvements on national forests which they themselves finance. The new policy was reviewed in its formative stages by the livestock industry and other interested groups, and was formally adopted on April 14, 1953.

Under the new policy, increased grazing capacity resulting from reseeding or other range-improvement work at the permittee's expense will be available for use by the permittee or permittees making the investment, provided the improvements (1) are approved in advance under either a special-use permit or cooperative agreement; (2) do not conflict with other uses of the national forests; (3) are beneficial to the range; and (4) continue to be effective.

The policy also provides that use of the increased grazing capacity may consist of (1) increased forage for existing permitted numbers of animals where the present supply is inadequate, or (2) increase in permitted animals or animal-months after range conservation needs are fully met. Where an increase in permitted numbers is allowed, such increase will be recognized as being of the same status and subject to the same policies that apply to other grazing preferences.

2. *Distribution of grazing privileges.*—Department policies have long provided for so-called "distribution" adjustments in large permits, in order to provide increases in small permits or to admit new and needy small applicants.

Since 1939 practically no adjustments for distribution have been made. Probably few, if any, such adjustments will be made in the foreseeable future. For these reasons, a change in Departmental regulations is under consideration to delete specific provision for distribution adjustments. This would require corresponding adjustments in the Forest Service Grazing Manual.

However, the broad, general legal authority to make such adjustments would still exist both in Departmental regulations and in law. The legal authority is based on the Act of June 4, 1897, which permits grazing on the national forests and authorizes the refusal of applications for renewal of grazing permits in whole or in part if in the public interest to do so. This law also authorizes the prescribing of conditions and requirements under which permits will be issued or terminated.

Under the proposed policy, existing permittees will feel that there is less likelihood of distribution adjustments, and a corresponding increase in the stability of national-forest grazing permits. In accordance with past practice and the provisions of the Granger-Thye Act in 1950, this proposed policy change has been submitted to the livestock industry, grazing advisory boards, and other interested groups for their review and suggestions.

3. *Transfer adjustments.*—Reductions in numbers of permitted livestock at the time a permit is being transferred from one permittee to a new permittee have been a source of much friction. When such

reductions are made, it is usually for purposes of range conservation or protection, and but rarely for distribution. It is sometimes felt that the Forest Service automatically reduces numbers of permitted livestock when a permit is transferred, regardless of the need.

Department policies on this matter have changed from time to time. Prior to 1949, a maximum reduction of 20 percent could be made for either range conservation or distribution when a preference was transferred in connection with purchase of either ranch property or livestock. But where the transfer involved purchase of both ranch property and livestock, the maximum permissible reduction was 10 percent. In 1949 the percentage provisions were eliminated with respect to range conservation adjustments, but a maximum of 20 percent still applied to distribution adjustments. The 1949 policy, under which the Forest Service has been operating, provides that no grazing preference is to be transferred for numbers greater than the estimated grazing capacity of the range.

A new policy has been tentatively approved, which would provide that necessary reductions in numbers of permitted livestock in order to conserve the range would be made as and when planned without relation to any transfer of the grazing preference. As in the case of the revised distribution policy, this change has been submitted to the livestock industry, grazing advisory boards, and other groups for their review and suggestions.

Under the policy, scheduled reductions which happen to coincide with transfers would be made as scheduled. Protection reductions would not be planned to coincide with transfer of permits, but neither would needed reductions at such time be prohibited. The Forest Service would continue its past policy of giving both prospective seller and purchaser of base property or permitted livestock the fullest possible information concerning estimated grazing capacity, condition of the range, and probable status of the preference after transfer. This policy will remove any question of automatic reductions at time of transfer.

Legislative Events

The first session of the 83d Congress gave much attention to grazing on the national forests. Six bills, three in the Senate and three in the House, would affect national-forest grazing in important ways. These are: (1) Identical bills, S. 1491, by Senator Butler for himself and Senator Barrett, and H. R. 4023, by Congressman D'Ewart; (2) companion bills, S. 1509, by Senator Aiken, and H. R. 4268, by Congressman Hope; and (3) identical bills, S. 2548, by Senator Aiken, and H. R. 6787, by Congressman Hope.

The Butler-Barrett-D'Ewart bills were prepared by a Stockmen's Grazing Committee after much consideration, and hearings were held on them by both the House and Senate Interior and Insular Affairs Committees. The Department did not testify and took no position on them. Although the congressional committees did not report the bills, the press gave national publicity to them and to the hearings. This served to focus nationwide attention on national-forest grazing matters.

The first two bills by Senator Aiken and Mr. Hope—S. 1509 and H. R. 4268—would have enacted some Departmental policies into law,

and would have provided for multiple-use advisory councils. The bills received little attention in the Congress; hearings were not held; and the Department took no position on them.

Both before and after the hearings on the Butler-Barrett-D'Ewart bills, representatives of stockmen and other groups were in consultation with both the Forest Service and the Secretary's office. Subsequent to the hearings on these bills, Senators Aiken and Barrett and Congressman Hope and D'Ewart, under Senator Aiken's leadership, endeavored to develop legislation which would be mutually acceptable to the various interested groups and in the public interest. The Department participated in these endeavors as technical adviser.

On July 31, 1953, the President submitted to the Congress a message relative to "A Program Designed To Conserve and Improve the Nation's Natural Resources." The message made specific reference to the grazing resources of the national forests, and stated: "The Federal Government has a responsibility to manage wisely those public lands and forests under its jurisdiction necessary in the interest of the public as a whole. . . . Public lands should be made available for their best use under conditions that promote stability for communities and individuals and encourage full development of the resources involved." On the following day, Senator Aiken and Mr. Hope introduced S. 2548 and H. R. 6787, identical bills, which would implement the President's message and which were introduced at the request of the President.

These bills deal with construction of range improvements by permittees, transfer of grazing privileges, base property standards, an economic study to help develop a method for determining grazing fees, boards of appeal with respect to grazing uses, formal hearings, and appeals to the courts. The bills also spell out certain exceptions to their provisions, and recognize the importance of all resources and uses of the national forests. The Department has recommended their enactment.

It is evident from the preceding statement and summary that much attention has been devoted to grazing on the national forests during the past year, not only in the Forest Service but also in the Secretary's Office and the Congress. This is because of the importance of grazing on the national forests and the tension surrounding some of the problems of range administration. Progress toward better understanding and partial resolution of some of the most difficult problems has been made. There has been no arbitrary action by the Forest Service. Interests of all groups have been considered, and the problems have been discussed with all groups of users. There is better understanding of Departmental policies and procedures by grazing permittees, other user groups, and members of Congress.

There will always be some conflict of interests between various users, between water production and grazing, between sportsmen and stockmen, between big game and domestic livestock, and even to some extent between timber and grazing. But the Forest Service will make every effort to keep such conflicts to a minimum through good administration and management. There is every reason to believe that the great majority of grazing permittees on the national forests are reasonably well satisfied with Forest Service administration.

THE YEAR'S WORK

NATIONAL-FOREST ADMINISTRATION

The year's work in various phases of national-forest administration is reviewed in the following pages. Range management on the national forests is discussed in the preceding section, so is omitted here.

Receipts Exceed Expenditures

Again in fiscal year 1953, the cash receipts from national-forest operations reached a new all-time high. The national forests took in receipts amounting to \$76,463,746 for the year. This total did not include some \$1,500,000 collected by the Department of the Interior for oil and gas leases on national-forest lands. The 1953 receipts were well above the previous record of \$71,402,511 for fiscal year 1952.

Last year's expenditures from regular appropriations for the national forests, including both the current operating and capital expenditures, amounted to \$64,540,364. The receipts thus exceeded expenditures by nearly \$12,000,000.

In addition to the increase in cash receipts, there was an estimated increase last year of more than \$70,000,000 in the value of capital assets of the national forests. This estimate is based on increases in stumpage values and annual timber growth.

The greatest public values of the national forests, of course, are those that cannot be readily expressed in monetary terms. The value of such benefits as reduction of floods, assurance of dependable water supplies, contributions to community stability, and outdoor recreation for millions of people, is indeed beyond reckoning. Yet the substantial cash income of the national forests more than covers the cost of obtaining these benefits.

Financial returns to the States

Congress has provided that an amount equal to 25 percent of the gross receipts from the national forests be paid each year by the United States Treasury to the States for distribution to counties containing national-forest lands. These payments, which totaled \$18,649,794 for fiscal year 1953, are for the county school and road funds.

Some counties where national forests are doing a big timber-sale business are getting very large annual payments. For counties which have only a small amount of national-forest land or where the values on much of the land are noncommercial, the payments are small. Where deforested lands have been acquired for national-forest purposes, the yearly payments will be low during the period of forest restoration, but may be expected to increase in later years.

In addition to these direct cash payments to the States, Congress has provided that 10 percent of the national-forest receipts be made available each year for expenditures on forest roads and trails in the States of origin. Direct appropriations also are made for forest highway and road construction and maintenance. The forest highways built with these appropriations are important links in the States' main highway system.

Besides the expenditures for road construction and maintenance, there are many other contributions-in-kind to the States and local communities. These include maintenance of organized fire-control forces, reforestation and other development work that greatly benefits the States, and the costs of which otherwise would have been borne by the States and local governments alone.

In the aggregate, these payments-in-kind plus the 25-percent payments greatly exceed the total of taxes that the State and local governments might derive from the national forests if they were subject to taxation. On the average, the value of the contributions-in-kind alone more than equals the estimated total tax potential of the national-forest lands.

Watershed Management

Because the national forests occupy many of the water-yielding areas at high elevations, a substantial part of the Nation's water supply originates within their boundaries. The yield of water from western national forests is particularly significant. In the 11 Western States the national forests yield about 53 percent of the total runoff although they occupy only 21 percent of the area. In addition to this measurable streamflow, large amounts of water sink into the ground in the national forests to help recharge underground water basins which furnish a substantial portion of the total water supply.

The national forests are a major source of water for some 1,800 cities and towns. Hundreds of other communities and thousands of residents of rural areas also receive all or part of their water supply from these public forest watersheds, often located many miles away in another State. Much of the irrigation agriculture in the Western States depends on water from national-forest watersheds. These forests are the source of water for more than 600 hydroelectric power developments, and for thousands of industrial plants. It is therefore a prime purpose in protecting and managing the national forests to assure a regulated waterflow of good quality for the communities, farms, and industries dependent on that water supply.

Soil classification is being undertaken in California and the Pacific Northwest as a basis for attaining better watershed and other management practices. Washington State College is cooperating with the Forest Service on soil classification work now well along on the Gifford Pinchot National Forest. In the same region a special study of drainage and erosion control on roads and trails has been under way during the past 2 years. In California a vegetative-soil survey in the Mendocino National Forest is being conducted with the cooperation of the University of California, the Bureau of Plant Industry, Soils, and Agricultural Engineering, and the Soil Conservation Service. Over 400,000 acres have been covered. This survey is furnishing information of great value for correlating land-management activities for better watershed management.

The Forest Service is continuing its efforts to improve the usefulness of the water resource through studies of upstream water requirements and to arrange for suitable water releases from large upstream reservoirs to preserve fish life and enhance recreational values. A recent development in this field is a cooperative investigation in connection with power projects on the Feather River in California. Co-

operating with the Forest Service are the Pacific Gas and Electric Company, the California State Department of Fish and Game, and the United States Fish and Wildlife Service.

Another cooperative project in California including Federal, State, and private groups and individuals resulted in a joint report entitled "A Coordinated Land and Water Conservation Program on the Pit (Pilot) Soil Conservation District," completed in March 1953. Participants included the Pit Soil Conservation District, the Soil Conservation Service, Bureau of Land Management, California State Division of Water Resources, State Department of Fish and Game, the Shasta Forests Company, and the Forest Service.

A striking watershed management demonstration can be seen in the Jefferson National Forest in Virginia. Here the water supply of the town of Narrows has been transformed from a state of high turbidity following storms to one of very satisfactory clear flow. This change was brought about by checking the erosion on logging roads left by an operator of timber reserved for cutting by the owner when the land was sold to the Federal Government. As a result of the effectiveness of the treatment the town has cooperated with the Forest Service in planting 10,000 trees and has plans for planting an additional 10,000 in the watershed.

Power developments

Action on several hundred power cases during the year indicates continued peak activity in that field. The power transmission lines on national-forest land operating under Federal Power Commission license or Forest Service permit now total more than 1,000 miles. This includes cooperative lines of the Rural Electrification Administration.

Water storage

Fifteen new dams were approved for construction on national-forest land during the past year, bringing the total number of artificial reservoirs to over 1,700.

The development of water resources by reservoir construction within national forests sometimes has profound effects on the management and utilization of other national-forest resources. The submerging of main avenues of access to the upstream watersheds may disrupt sustained-yield timber working circles and fire-control systems. In some cases whole valleys of productive timberland may be inundated, fishing streams and recreational and other facilities eliminated. Two such reservoir projects, Libby Reservoir, planned by the Corps of Engineers in Montana, and Oroville Reservoir, by the State of California, are being given cooperative study to reduce their potential adverse effects on national-forest resources. Each agency is contributing funds to the Forest Service for conducting investigations and developing plans to aid in coordinating the interests of the Forest Service with those of the dam-building agency.

Timber Management

Timber harvested from the national forests in fiscal year 1953 amounted to 5,160 million board-feet, the highest annual cut in the history of the Forest Service. It was an increase of 742 million feet

over the 1952 cut. Receipts from sale of timber in 1953 were \$70,-616,025, again setting a new record.

The total cut included harvest of mature timber and cuttings made to improve growing conditions in crowded stands. Substantial quantities of Christmas trees, naval stores, and other forest products not expressible in board-feet, also were harvested.

A total of 22,020 timber sales were made during the year. Most of these were small sales, involving small timber operators. Of the total, 19,891 were for less than \$1,000 each; 1,087 between \$1,000 and \$5,000; and 1,042 over \$5,000. There were 2,309 sales of miscellaneous forest products.

Access roads needed to attain full sustained yield

The national forests of the United States contain some 73 million acres of commercial forest land. On the basis of current growing stocks, existing markets, and utilization standards, the sustained-yield capacity of these national-forest timberlands is estimated to be at least 6.9 billion board-feet. This estimated capacity will increase as the basic growing stocks are further built up and as utilization practices further improve.

Although the 1953 timber cut was the largest volume ever harvested from the national forests in any single year, it still was 1,740 million feet below present sustained-yield capacity. The full yield capacity of the national forests cannot be harvested mainly because many of the timber stands cannot yet be reached. Lack of access roads is principally a problem of the national forests of the West. These western national forests contain almost one-third of the total volume of saw-timber remaining in the United States. Here lies much of the potential for increase in national-forest timber yield.

Three types of timber access roads are needed: (1) Mainline roads, providing primary access to major drainages or large timbered areas; (2) lateral roads, that feed into the primary system and serve smaller drainages and blocks of timber; and (3) logging spurs, the low-standard roads which penetrate to all parts of areas being logged. Mainline roads and most laterals should be permanent roads that will be available for hauling the timber crop as harvested. Lateral roads usually receive intermittent use because they give access to smaller timber volumes. Logging spurs are constructed by the timber purchasers and are usually temporary roads serving small areas.

Mainline and lateral roads may be constructed either by the Government or, as a timber-sale requirement, by the timber purchaser. Whether the public or a timber purchaser builds the road the cost is borne by the United States. If the timber purchaser builds it, the anticipated cost is deducted from the price he can be expected to pay for the timber. If the Government provides the road, a correspondingly higher price for stumpage can be obtained.

At present very few national-forest working circles are wholly accessible for timber harvesting. For many of the partially developed working circles some new construction and reconstruction will be needed to maintain even the current rate of timber harvesting. Additional new construction will be needed to increase the cut to full sustained-yield capacity. The cost of additional access roads within the next few years will be more than offset by the income from increased timber sales.

First pulp mill in Alaska

The Forest Service in July 1951, accepted a bid from the Ketchikan Pulp Company to purchase 11½ billion cubic feet of timber in the Ketchikan pulp-timber unit of the Tongass National Forest in Alaska. In accordance with the terms of the timber-sale contract, this firm is now constructing a pulp plant of around 350 tons daily capacity at Ward Cove near Ketchikan. This, the first major pulp plant in Alaska, is scheduled to go into full operation on July 1, 1954.

The opening of this operation will mark the fruition of 30 years of effort by the Forest Service to bring about the development of a pulp and paper industry in Alaska. Year-round industrial activity is badly needed to expand and develop southeastern Alaska. Pulp and paper manufacture offers one of the best prospects for building up this section of the Territory.

Insect control

An epidemic of southern pine bark beetles appeared on and near the Homochitto National Forest in Mississippi late in the spring of 1952. Previously an ice storm had damaged many trees in the area, providing favorable host material for a rapid insect buildup. Drought conditions over a period of a year or more also had weakened many trees so that they were easy prey for the beetles. The Forest Service, the State Forester for Mississippi, and private land owners in the area immediately started a cooperative control project. The Bureau of Entomology and Plant Quarantine provided overall technical advice. Control work consisted of logging several million board-feet of infested trees, supplemented by chemical treatment of trees and parts of trees which could not be logged. Fast, concerted effort by all cooperators has brought the epidemic under control and saved a resource worth many millions of dollars.

An outbreak of Engelmann spruce beetles started in the summer of 1952 in western Montana and northern Idaho. The epidemic was the result of violent windstorms of 1949 that knocked down a tremendous number of trees, resulting in ideal conditions for a buildup of the beetles. Already many million board-feet of standing spruce timber of fine quality are infested and will die. Over 12 billion board-feet of spruce timber are ultimately threatened. As a result of prompt Federal, State, and private cooperation a plan of control has been developed, and operations started in the spring of 1953. A substantial program of access-road construction and logging of infested trees is planned. This will be supplemented by chemical treatment. Seventy-eight percent of the spruce timber is on national-forest lands.

The Engelmann spruce bark beetle control project carried on in Colorado for the past 3 years has resulted in successful control of this epidemic.

Reforestation

During fiscal year 1953, 51,249 acres of national-forest land were planted or seeded to trees. Successful plantings now total 1,496,915 acres. A substantial amount (28,058 acres) of the past year's seeding and planting was done on areas recently cut over, with funds deposited by timber purchasers under terms of the Knutson-Vandenberg Act of 1930. This Act authorizes the Forest Service to require, in addition to the charges made for timber sold, deposits of funds to be used for

reforestation and stand improvement of timber-sale areas to keep such lands growing high-quality timber. On other national-forest areas, 23,191 acres were planted and seeded with funds appropriated by Congress. Some 4 million acres of national-forest land need reforestation to put them to work producing timber for an expanding population.

Costly planting is avoided whenever measures can be taken to facilitate the establishment of natural regeneration on burned and cutover areas. Where seed-bearing trees still stand, timely control of seed-eating rodents and scarification of the soil surface often help a new crop of seedling trees to become established. During the year 21,464 acres received such treatment.

Timber stand improvement

Funds collected in connection with timber sales, under authority of the Knutson-Vandenberg Act, make possible some timber stand improvement work each year looking to the establishment of natural tree growth and protecting it through the critical period of early growth. This work also helps to obtain stocking of trees of desirable species, form, and quality. Timber stand improvement in promising young growth not associated with timber-sale cuttings is done with funds directly appropriated by Congress. During the past year the following timber stand improvement work was done with "K-V" funds and appropriated funds:

	<i>Acres</i>
Plantation release.....	19,438
Natural stand release, weeding, and thinning.....	264,623
Pruning.....	103,224
Animal control (hogs, etc.).....	245,943
Rodent control.....	39,308
Disease control.....	56,954
Other.....	43,078

Recreation

Public use of the national forests for recreation again reached an all-time high in 1952, with 33 million visits reported. This was a 10-percent increase over the previous year. It was 83 percent greater than in 1941, the year of highest prewar use.

Forty-two percent of the visitors used the camp and picnic-ground facilities. Fishing, hunting, skiing, hiking, and riding were other popular recreational activities. The national forests provide the most widely used public properties in the United States for those seeking these outdoor, forest-type recreation activities.

The policy of making a moderate charge for use of the camping, picnicking, and swimming facilities was continued at some 45 of the larger, better improved camp and picnic areas. Most of these were operated by concessioners, who could meet the costs of operation and current maintenance out of the money collected. (Funds collected at charge camps operated directly by the Forest Service go to the U. S. Treasury and are not available for maintenance and cleanup work.)

Facilities still overtaxed

As the use of national-forest recreation areas steadily increases, it is becoming more and more difficult, with the funds and manpower now available, to maintain the camp and picnic grounds in safe and

sanitary condition. Overcrowding and the steady deterioration of sanitary and fire prevention facilities present an acute problem. Several bills aimed at relieving this situation were introduced in the 83d Congress.

Winter sports

Within the past two decades, skiing has become a major recreational activity in the United States. The national forests, particularly in the West, afford some of the country's best and most heavily used ski terrain. To meet the growing demand, the Forest Service has developed some 200 winter sports areas. On some national forests skiing now ranks first as a recreation pursuit.

Four new ski lifts and warming-shelter buildings were completed under special-use permit during the year. They represent an investment of more than a million dollars of private capital. All ski lifts, tows, and shelter buildings on the national forests are operated on a concession basis under Forest Service permit.

The study of avalanche-hazard forecasting and control under way at Alta, Utah, Berthoud Pass, Colo., and Stevens Pass, Wash., is producing some worthwhile results. Degree of avalanche hazard can now be determined by evaluating 10 different snow and climatic factors which contribute to the occurrence of avalanches. An "Avalanche Handbook," the first of its kind in the United States, was published for field personnel and cooperators in 1953.

Wilderness areas

Conservation organizations are taking an increasingly active interest in the perpetuation and management of the 79 wilderness areas that have been set aside within the national forests. A meeting attended by members of the Natural Resources Council from many parts of the country was held in Washington early in the year to consider wilderness area policy and management.

One new area, the Linville Gorge Wild Area, within the Pisgah National Forest of North Carolina, has been added to the wilderness-area system. It comprises 7,610 acres of southern forest types, including extensive areas of rhododendron and laurel, bisected by the rugged Linville Gorge. It is the first wild area established in the East.

The Executive Order establishing an airspace reservation over the canoe wilderness area of the Superior National Forest in Minnesota has been upheld by the Federal District Court and the Circuit Court of Appeals. Frequent violations occurred at the outset, but these have ceased after some prosecutions in Federal court.

Wildlife

Wildlife is one of the major recreational resources of the national forests. Nearly 9 million visits were made to the forests for hunting and fishing last year. One reason the national forests are so popular with sportsmen is that these forests offer a public hunting and fishing ground of 180 million acres where the sportsmen are not restricted by "No Trespassing" signs. Moreover, the quality of the sport found on most areas is high.

Production of wildlife on the national forests is advanced under multiple-use management. Protection of the forests from uncon-

trolled fire, and sustained production of timber, forage, and water all contribute to the maintenance of a desirable environment for wildlife. Furthermore, wildlife needs are given specific consideration in all phases of resource management.

The Forest Service wildlife-management program involves two major approaches. These are (1) the protection and improvement of the habitat, and (2) the maintenance of close cooperative relationships with the State fish and game departments.

Favorable environment or habitat is a basic requirement for sustained production of fish and game animals. This is because every animal must have a place to live, a place where its requirements for water, food, and cover can be met. Very often the Forest Service can adjust uses of the forest to protect or even improve wildlife food and cover conditions.

The Forest Service seeks close cooperative relations with the State fish and game departments. State game laws apply on the national forests. Thus the State agencies are handling the protection and utilization of the wildlife resource. Since management of the land (the wildlife habitat) is a responsibility of the Forest Service, cooperation is mutually advantageous.

During the past year, the wildlife section of the Forest Service Manual of instructions for administrative officers was completely revised, in order to bring up-to-date and reemphasize major policies and objectives in this field. Prior to final approval, representatives of the States and other cooperators were asked to review the revised draft. Many valuable suggestions were received.

Cooperative agreements

In Indiana an agreement covering both national-forest and State-forest lands established objectives for a long-term program of intensive habitat improvement. A special area agreement covered part of the national forests in Texas and was designed to implement habitat improvement through a State Pittman-Robertson project. The existing cooperative agreement in West Virginia was revised in line with new State legislation providing for special State-collected fees for hunting and fishing on national-forest lands.

Cooperative habitat management on Virginia's national forests stressed development of wildlife openings by means of timber sales. In California a cooperative habitat-improvement project was the State-financed construction of flow-control dams on headwater streams to provide continuous water supplies for fish during the summer and fall periods. Other work in California included clearing and seeding of brush fields to provide openings for wildlife, and development of watering devices for quail.

In the national forests in Wisconsin, cutting of cedar in winter deer yards was restricted to the winter period so that tops and other slash would be available to supplement scanty food supplies. Location of sales was also designed to give maximum benefit to deer. In the national forests in Wisconsin and northern Michigan extensive areas of openings were left unplanted to provide sharptail grouse range. Special management plans were prepared for these areas. In North Carolina progress was made in developing timber-cutting methods which would provide sprouts for deer food and still retain an adequate growing stock of timber.

Overpopulation problem

Utah held its first statewide either-sex deer hunt in 1952, to help meet the problem of overpopulation. Wyoming and Colorado both set two-deer bag limits on several heavily populated areas where an increased kill was desirable. Michigan and Pennsylvania enacted new legislation permitting more liberal harvesting of problem deerherds. Indiana and Virginia anticipated critical problems from growing deerherds and held either-sex hunts. In Indiana this was the first deer hunt in more than 50 years.

Special Land Uses and Mining

Special uses

The use of national-forest land for a variety of purposes is authorized by special-use permit. Over 50,000 such permits, embracing some 2 million acres, were in force last year. They covered some 110 different types of uses, such as summer homes, resorts, telephone lines, television stations, pastures, military camps and maneuver grounds, etc.

With the advent of television and microwave transmission systems, national-forest lands have assumed a new importance for relay and transmitting stations. Since high locations for visible range are essential, many national-forest peaks have become very valuable for transmission and relay sites, particularly in California and other parts of the West. The authority of the Department of Agriculture to grant easements for telephone, telegraph, and transmission lines has now been broadened by action of Congress to include sites for radio and television purposes and to extend the width of rights-of-way for power and telephone lines. In order to protect the future interests of the United States the Forest Service reserves certain rights of joint use at sites suitable for television and relay stations.

Mineral leases

Lands in those national forests established under the Weeks Law may be leased for the utilization of minerals, under such provisions as may be necessary to safeguard other national-forest values in the public interest. In national forests reserved from the public domain, the Mineral Leasing Act of 1920 provides for the leasing of lands for development of certain specified minerals—coal, oil, gas, oil shale, sodium, sulfur (in Louisiana and New Mexico), phosphate, and potassium.

Mineral leasing, particularly for gas and oil, continues to be an important activity on the national forests. It requires careful supervision, however, to prevent damage to surface resources. The leases are issued by the Bureau of Land Management in the Department of the Interior. The Forest Service reviews each application and recommends to the Bureau of Land Management the stipulations which should be incorporated in the lease to protect surface values.

On western national forests an estimated 4 million acres of national-forest land is under lease for gas and oil development. There has been considerable interest during the past year in manganese deposits in the Appalachian area, and in the search for nickel, cobalt, copper, and related minerals in the Superior National Forest of Minnesota.

Mining claims

On the national forests reserved from the public domain, the General Mining Laws give any person the right to locate, enter, and patent national-forest land upon discovery of mineral values (except for the eight minerals covered by the Mineral Leasing Act).

Minerals are important resources of the national forests. Prospecting for and utilization of mineral resources is desirable forest use, in line with the policy for multiple-purpose administration of national-forest lands. Many minerals are critically needed, and the Forest Service wishes to encourage their discovery and development.

The large number of mining claims, however, has caused a serious problem in the western national forests. Of some 36,600 claims covering over 918,000 acres that have been patented within the national forests, it has been estimated that only about 15 percent have ever been commercially mined. In 1952 there were an estimated 84,000 unpatented claims, covering 2,163,000 acres of national-forest land and supporting timber worth more than \$100,000,000. But only an estimated 2 percent of these claims were being commercially mined.

Mining claims frequently interfere with the orderly harvesting of timber. Much of the problem is brought about not by bona fide miners but by those who may have no intention of doing any real mining and may be attempting to obtain title to valuable public timberland or summer home sites by using provisions of the mining laws. There is no limit to the number of claims a person may file on, and in rare instances a single claimant or group of claimants has located on thousands of acres of high-value public timber, watershed, and recreation land.

Several bills looking to the modification of the mining laws are pending in the 83d Congress. These include proposals to protect the surface values of lands within the national forests, and to remove deposits of sand, stone, gravel, pumice, and cinders from location under the General Mining Laws, and provide for their disposal on a permit basis.

Hearings were held during the year by the House Committees on Agriculture and on Interior and Insular Affairs. Later, a joint subcommittee of the two committees was appointed to study the mining claim problem with a view to reaching an agreement on corrective legislation.

At the request of the Secretary of Agriculture, the National Forest Advisory Council investigated the mining-claim problem, and reported to the Secretary describing the situation and recommending remedial legislation.

The Forest Service hopes that a solution to the mining-claims problem can be found which will encourage the development of national-forest mineral resources without unnecessary impairment of surface values.

Fire Control

In 1953, up to July 31, the Forest Service fought 4,360 fires in the national forests. This was well below the figure for the corresponding 7-month period of 1952, when 5,469 fires were reported. The acreage lost in 1953, however, was much greater—160,250 acres burned

in the first 7 months of 1953, compared with 52,894 acres in the corresponding period of 1952.

A big share of this acreage loss occurred in California. Early in the summer, dry weather and strong winds caused several fires to roar away to large size before control could be established. Some 67,000 acres were swept by fire in the national forests of California during the 7-month period.

In one of these fires, 15 fire fighters lost their lives. They were members of a crew fighting the Rattlesnake Fire on the Mendocino National Forest in northern California. The tragedy occurred on July 9, when a sudden change in the wind caused the fire to jump a road and overtake the men before they could get out of its path. The fire was of incendiary origin. It was brought under control on July 11, after burning over 1,100 acres. Regional investigators were in the field the day after the disaster, and 4 days later the Chief of the Forest Service appointed a Board of Review.

In August, dry lightning storms caused large numbers of fires in the national forests of the northern Rocky Mountain and Pacific Coast States. California had 197 lightning-caused fires on August 13 and 137 on August 14. Forest Service regional headquarters for Montana and North Idaho reported more than 1,100 lightning fires in the first 20 days of August. Smokejumpers made more than 800 parachute jumps, and half a million pounds of air freight was transported to fires burning in the inaccessible areas of this region.

The 1952 fire year

The Forest Service in 1952 experienced one of its longest and most hazardous fire seasons. Drought conditions during the fall months all over the country were the worst faced in 25 to 30 years. In the Western States the active fire season, which usually ends in September, extended an additional 60 days well into November. No major conflagrations developed in the national forests of the West, however, despite the critical fire conditions. Most of the larger fires on national-forest lands during the fall months occurred in the Southeast, where an unusually dry summer and fall was experienced. In this region more than 600 fires started in October and November, when few fires normally occur.

During 1952 the Forest Service controlled 11,965 fires in the national forests. Of these, 4,944 were caused by lightning. Man-caused fires totaled 7,021, many of which occurred during the late fall fire season.

During the year 219,590 acres of forest and watershed lands within the Forest Service protective boundaries were burned over, compared with 395,625 acres in 1951. This reduction in burned acreage was accomplished despite an increase of 1,580 in the number of fires.

Mechanizing fire suppression

Of some 2,500 miles of fireline built in 1952 to control the 11,965 forest fires in national forests, 820 miles were built with machinery. Most of the machine-built fireline was in the Southern Region, where the topography and timber types are especially suited to use of machinery in controlling forest fires. Specialized plow equipment for use in different fuel and soil types has been developed and successfully used there.

Small portable, self-propelled equipment for fireline construction is being developed and field tested in the western regions. Twenty-five flail-type, and three spiral fireline trenchers are now in use on an experimental basis. The flail-type trencher weighs 260 pounds and is designed for parachute delivery from an airplane for use on back-country fires by smokejumpers. A lightweight portable power brush and sapling cutter and a lightweight brush and grass mower have been demonstrated along with the trenchers.

Trucks with pumper-tanker apparatus were used on 2,189 fires last season. On 998 of these fires, the equipment was used for fast initial attack. During the past 3 years special slip-on fire-pumper-tanker units for ½- to 1-ton pickups and 1½-ton trucks have been developed. These were adopted as standard for the Forest Service during 1952. About 200 of the new smaller sized units are now in field use with various protection agencies.

Smokejumpers and aircraft use

Smokejumper crews are stationed during the fire season at Missoula, Mont.; McCall, Idaho; Chelan, Wash.; and Cave Junction, Oreg. The smokejumpers attacked 267 fires in 1952. On these fires, 836 individual jumps were made and 1,375 man-days were worked. An estimated \$1,300,000 of the fire-suppression costs were saved by use of the smokejumpers on these back-country fires.

Airplanes were used in 1952 to transport more than 8,000 men and approximately 525,000 pounds of fire equipment and supplies, about 250,000 pounds of which were dropped to men fighting fire in inaccessible country. About 11,000 hours of flying were necessary. Use of helicopters dropped from 548 hours in 1951 to 76 hours in 1952, because of a lack of suitable commercially operated helicopters available to the Forest Service.

Improvements and Facilities

Roads and trails

A total of \$24,336,000 was available for construction and maintenance of national-forest roads and trails in fiscal year 1953. Of this total, \$11,000,000 was available from appropriations authorized by section 23 of the Federal Aid Highway Act of 1948, and \$6,963,892 from "10 percent funds" (10 percent of national-forest receipts for fiscal year 1952) allocated for roads and trails as provided by the act of March 4, 1913. The balance was from unobligated funds made available in fiscal year 1952.

These funds were programmed for:

Maintenance of 80,341 miles of road, and 119,433 miles of trails.

Replacement of 693 unsafe bridges.

Construction of 41 new bridges.

Reconstruction and surfacing of 264 miles of roads.

Construction of 463 miles of road (including 326 miles for timber access).

Included in the construction figure was 27 miles of road on the Siuslaw and Umpqua National Forests in Oregon to facilitate the sale of dead and threatened timber in stands infested by the Douglas-fir bark beetle. Purchasers of the timber will build the additional branch roads needed for salvaging this timber.

In fiscal year 1953, 887 miles of permanent timber-access roads were built and 352 miles of existing roads were improved by purchasers of national-forest timber.

Congress provided a supplemental appropriation of \$5,000,000 for timber-access roads in Idaho and Montana where an infestation of bark beetles threatens to destroy extensive stands of Engelmann spruce. Access roads will aid the salvage of trees that are already dead or dying, as well as facilitate control measures. The infestation might have been avoided if an adequate system of timber-access roads had existed to make possible the prompt sale and removal of trees uprooted and weakened by severe windstorms in 1949 and 1950. These wind-damaged trees subsequently became a breeding ground for the bark beetles.

National-forest transportation system

The existing transportation system currently includes 20,269 miles of forest highways, 117,229 miles of forest development roads, 120,821 miles of trail, 86 landing fields for rigid-wing craft and 5 heliports suitable for rotary-wing craft. States and counties maintain 48,467 of the 137,498 miles of forest highways and roads. Purchasers of national-forest timber and other road users maintain 9,517 miles of national-forest development roads.

Forty-two percent of the roads in the national-forest transportation system are inadequate for the class of traffic that uses them. States and counties have assumed the maintenance obligation for a considerable mileage of the better national-forest roads in recent years. But the Forest Service maintains a large mileage of low-standard roads used heavily by forest recreation seekers and other public traffic. Upkeep of these roads drains a major portion of the total road funds available to the Service. A few of these roads are already used in excess of their safe capacity while many fail to provide the all-weather service sought by local residents.

Mapping

During the fiscal year 1953, the Forest Service completed control surveys and topographic maps for 922 square miles of national forests and adjoining lands in Arizona, California, and Idaho.

Planimetric maps were completed for 21,913 square miles of national forests and adjoining lands in Montana, Colorado, Arizona, New Mexico, Idaho, California, Oregon, Washington, and Pennsylvania.

Contracts for aerial photography for both national-forest mapping and resource-inventory purposes were awarded for a total of 6,266 square miles. Bids are pending for an additional 11,300 square miles.

National Forest Properties

On June 30, 1953, the net area of the 153 national forests and other lands administered by the Forest Service was 181,273,765 acres. This compares with 181,145,764 acres as of the same date in 1952. During the year, therefore, no major changes in national-forest areas occurred.

Lands may be given national-forest status or be removed from that status by executive or legislative action and by purchase, exchange, and donation. During the year, 196 exchange transactions involving national-forest lands or timber were approved pursuant to the several

exchange laws. In these transactions, the landowners offered to the Government 210,312 acres of lands within or adjoining national forests in exchange for 256,106 acres of national-forest land or land utilization project lands and about 81 million board-feet of national-forest timber. Thus there was a net relinquishment of about 46,000 acres in exchange transactions during the year.

A total of 7,969 acres were approved for purchase during the year, with an obligation of \$99,288. This small acreage is principally in the national forests established under the Weeks Law in the eastern United States, including the wilderness canoe area of the Superior National Forest in Minnesota. Eight donations, involving 3,245 acres of land were accepted during the year.

A number of changes involving administrative status of Federal lands were made. Transfers out of the national forests included 6,043 acres from the Olympic National Forest to the Olympic National Park in the State of Washington, and 2,745 acres from the Coronado National Forest to the Coronado National Monument in Arizona. Transfers of Federal land to national-forest status included 91,800 acres of rural rehabilitation lands in New Mexico, which has been administered by the Forest Service since 1947; about 5,100 acres of military reservation lands in Montana; and about 33,000 acres of public-domain lands in Montana.

During the past year, increasing attention has been directed by groups and individuals to questions of forest land ownership, and particularly Federal ownership. The Forest Service also is giving much study to this matter. A reexamination of national-forest boundaries and purchase units is under way.

COOPERATION IN STATE AND PRIVATE FORESTRY

The development of the national forests and advancement of State and private forestry work have gone forward together. Each complements the other.

The Weeks Law of 1911 provided both for the establishment of national forests in the headwaters of navigable streams and for Federal participation with the States in cooperative protection and management on non-Federal lands. The Clarke-McNary Act of 1924 and subsequent legislation broadened and strengthened the authorizations for these programs.

In many ways the national forests have been instrumental in encouraging the initiation and development of protection and management on State and privately owned forest lands. The cooperative programs for the protection of forests from fire and destructive pests, production and distribution of planting stock, and technical assistance to forest owners and the processors of forest products are designed to further encourage and facilitate good forestry practice on non-Federal lands.

The Secretary of Agriculture has been authorized to cooperate with the States in these programs, and he has delegated these authorities to the Forest Service. In addition, the Forest Service participates actively in developing the forestry practices to be included in the Agricultural Conservation Program, and for a number of years has been assigned directly the administration of the naval stores conserva-

tion phase of that program. The Forest Service also supplies subject-matter information for the farm forestry extension work conducted by the land-grant colleges and State extension services in cooperation with the Department of Agriculture's Extension Service.

Forest Management Assistance to Woodland Owners

Thirty-eight State forestry departments are cooperating with the Forest Service in providing on-the-ground technical assistance to owners of private forests and to small sawmill operators and other processors of primary forest products. The Cooperative Forest Management Act of 1950 is the basis for this cooperative program.

Under the Cooperative Forest Management Act, both farm and non-farm owners of small forests are advised and assisted in the management of their woodlands and in marketing the harvested products. The technically trained foresters who carry on this work are employed by the cooperating States. These men are called farm, service, or project foresters; sometimes they are referred to as county or local foresters. The Forest Service provides leadership and coordination for the program; it sets the standards for conducting the work and provides the necessary inspection; it apportions the Federal funds used in the program.

In fiscal year 1953 some 260 farm or project foresters were employed to handle this cooperative forest management work. These foresters assisted 32,474 woodland owners to establish better management practices on 2,827,700 acres of woodlands. Products harvested under their guidance amount to 527,419,000 board-feet of sawtimber and other forest products. In addition 192 barrels of naval stores and 160,140 gallons of maple syrup were collected. Christmas trees, holly, nuts, tree seed, pine cones, and other miscellaneous products valued at \$329,111 were harvested. The forest owners received a total of \$12,589,543 from the sale of all these products.

Owners are referred to private consulting foresters when the prospective operation warrants such special service. During the year the project foresters referred 671 woodland owners with 425,839 acres of woodland to private practicing foresters.

The project foresters advised 6,534 small sawmill operators and processors. Services to this small operator group are still very limited. Several of the States are planning to employ processor specialists. None are yet available.

At the end of the fiscal year, the project foresters had 4,909 unfilled requests for on-the-ground technical assistance from woodland owners. In many cases these foresters are unable to reach all woodland owners requesting service, since the project areas they serve are too large for efficient operation. In a number of States there are large areas where neither a project nor a private forester is available.

General forestry assistance

While the cooperative program gives primary emphasis to the small woodland owners and their needs, the progress of forestry on industrial and other large properties is not being overlooked. Usually working through the States, the Forest Service extends cooperation by making available a few highly specialized technicians for assist-

ance. The services of these specialists are also available to advise on the management of State and community forests and of forest lands in other Federal holdings such as those of the Army, Navy, and Air Force.

Because many large private landowners have their own foresters, either on a full-time or consulting basis, the Forest Service specialists usually serve as consultants to the privately employed foresters. A good example of work being done in this field is the contribution made by Forest Service specialists in the Lake States to the development and extension of a system for continuous inventory of forest stands.

Farm Forestry Extension

The Extension Service of the Department of Agriculture cooperates with 45 States and one Territory in conducting farm forestry extension work under section 5 of the Clark-McNary Act. The land-grant colleges and State extension services participate in this educational work. The Forest Service supplies subject-matter information for the program, and in other ways cooperates in the work to promote more efficient management and harvesting of the farm timber crop.

Through its system of county agents and forestry specialists, Extension turns its efforts to problems of individual owners and groups, develops "know-how" in forestry practices on the part of owners and creates a better general understanding of the importance of forestry. In at least 12 States the State forestry departments and extension services have definite agreements for carrying on correlated programs. These understandings provide for mutual cooperation to assure the farmer of better assistance in managing woodlands and marketing his forest products.

Increasing numbers of farmers are becoming interested in such phases of forestry as windbreak and shelterbelt establishment, woodland management, marketing and utilization of forest products, production of naval stores and maple products, preservative treatment of fence posts, and mechanization of farm forestry operations with the use of power saws, planting machines, maple tapping machines, explosive wedges, log loaders, and better sawmill equipment.

The 4-H Club forestry training camps and conservation camps have increased in enrollment. Forestry projects carried out in the home woodlands and demonstration of practices at county and district meetings have provided valuable experience to club members and have stimulated considerable local interest in forestry. During 1952, 181,847 4-H Club boys and girls received training in forestry, and 613,794 in fire and accident prevention.

Cooperative Distribution of Forest Planting Stock

Total production of trees for forest and shelterbelt planting by all nurseries—Federal, State, industrial, and commercial—was approximately 462 million in 1952. Of this total, 300 million were distributed under the cooperative program authorized and directed by section 4 of the Clarke-McNary Act. This was the greatest "C-M 4" production yet achieved. Early indications for the planting year 1953 were that the C-M 4 output would exceed the 1952 figure.

The Forest Service cooperates with the States in this program to encourage and facilitate tree planting on millions of acres where planting is needed for flood control, erosion prevention, and protection of water supplies and for restoration of deforested lands to productivity. Forty-three States, Hawaii, and Puerto Rico are participating in the work.

The trees are produced in nurseries in the cooperating States and made available to landowners at moderate cost. In a number of States the amount of forest planting stock available is insufficient to supply current demand.

Increasing attention is now being given in some States to the production of planting stock from locally grown seed. In a few cases, seed of selected trees of superior form and growth rate is being used to the extent that it is available. This is a most important consideration from the standpoint of ultimate yield. Regional committees for the improvement of forest trees through seed selection have been organized in the South, the Lake States, and the Northeast. The committees operate cooperatively with a membership made up of representatives of Federal and State agencies, colleges, and industries. There is need for greater attention to seed source, however, in many other areas.

Naval Stores Conservation Program

The naval stores conservation program, which in 1952 completed its 17th year, provides assistance to gum turpentine farmers who follow conservation practices in the Southeastern States of North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi. The program is authorized by the Soil Conservation and Domestic Allotment Act and is administered by the Forest Service for the Agricultural Conservation Program.

The program is designed to encourage producers to adopt and carry out good naval stores and forestry practices. The 1952-53 program provided payments at specified rates per face on tracts where trees were worked to a minimum diameter of 9, 10, or 11 inches. A payment was provided for selective cupping where tracts having a minimum of 50 trees per acre were cupped in a manner that would result in leaving as many trees in the stand uncupped as those which were cupped. A payment also was provided for restricted cupping. In addition to following the practices for which payments are made, a producer in order to receive any payment had to follow good timber-cutting practices and cooperate with the State fire prevention and suppression programs.

Within the active naval stores producing area, some 7,300 producers are working about 57 million longleaf and slash pine trees for the production of turpentine and rosin. The value of the 1952 naval stores crop was approximately \$40,000,000. Georgia has 75 percent of the producers and 75 percent of the timber worked. Florida has 6 percent of the producers and 17 percent of the timber; Alabama 5 percent of the producers and 4 percent of timber. The few score remaining producers are in Mississippi, North Carolina, and South Carolina.

In the 1952-53 season, 3,137 producers participated in the program with 45 million trees, and received a total of \$480,000 in conservation

payments. Comparable figures for the preceding year were 3,319 producers and 49 million trees, and payments of \$477,000.

The Soil Conservation and Domestic Allotment Act does not permit conservation payments for naval stores practices on Federally owned land. On the national forests, 350,000 trees were worked by 23 producers in 1952. These trees were worked under leases containing the same specifications as those in the naval stores conservation program.

The naval stores conservation program has resulted in the adoption of chemical stimulation by an increasing number of producers. This technique, developed by the Forest Service, stimulates and prolongs the flow of gum. It saves much labor; trees can be worked longer; and the loss that occurred from deeply scarred faces when the old wood-chipping system was used is reduced or eliminated. Only 5 percent of the producers used the chemical stimulation treatment on 6 percent of the faces in 1949. In 1952 30 percent of all gum turpentine producers in the naval stores belt used chemical stimulation on 40 percent of all faces.

Cooperative Fire Control on State and Private Forest Lands

For most of the States, 1952 proved to be an unusually severe fire year. For Kentucky, Virginia, West Virginia, Tennessee, Illinois, Mississippi, Louisiana, and Alabama especially, it was a year of very heavy losses.

Reported fires on State and private protected lands numbered 118,363, while an estimated 60,280 fires occurred on unprotected areas. The total of 178,643 fires was nearly 15 percent greater than that of the preceding year.

On protected State and private forest lands, fires burned 6,347,227 acres or 1.72 percent of the area. This was more than double the acreage loss of the preceding year (an increase of 108 percent). On unprotected lands, according to the best estimates available, 7,559,232 acres were burned, or 13.03 percent of the total lands unprotected, compared with 11.46 percent for the preceding year.

The bad fire danger conditions that prevailed were reflected in a substantial increase in the nationwide average of area burned per fire on protected areas. This average in 1952 was 53.6 acres, compared with a 1951 average of 31.4 acres.

58 million acres still unprotected

The Forest Service cooperated last year with 43 States and Hawaii in the protection of non-Federal lands from fire, under authorization of the Clarke-McNary Act. The cooperative program, now in its 42d year, is given overall direction and leadership by the Forest Service, which allocates the Federal funds among the participating States, audits the expenditures made by the States under the program, coordinates the objectives and efforts of the States' protective organizations, inspects the adequacy of the work, compiles records, and facilitates exchange of information on fire-control equipment and techniques.

Cooperative protection was extended during the year to an additional 5,278,000 acres under this program. Of the 426,694,000 acres of State and private forest and watershed lands needing protection in

the United States, 368,692,000 acres are now under protection. But more than 58,000,000 acres remain without any systematic protection.

The protection forces in many of the organized areas are still not strong enough to cope successfully with a really serious or a prolonged fire season, such as occurred in 1952. The protection effort needs to be strengthened in manpower and equipment, and bolstered by more intensive preventive activities.

Expenditures

During the fiscal year 1952 (latest available figures) the States and private owners spent \$26,636,876 in the cooperative protection program. The Federal Government made available to the States \$8,960,-230, making a total of \$35,597,106 expended in the program.

In addition to the expenditures in the cooperative program, local governments, private timber owners and operators during calendar year 1952 spent over \$16,000,000 for special fire-control equipment, improvements, and services.

Prevention of fire

For the past decade the Forest Service and the State forestry departments have jointly carried on a Cooperative Forest Fire Prevention program, with the very active cooperation of The Advertising Council, Inc. Under sponsorship of this Council, the advertising firm of Foote, Cone and Belding has given much time and effort to the program as a public service. The program, which features "Smokey," the fire-prevention bear, has served to publicize nationwide the need for forest-fire prevention. There remains a great deal that must be done in direct prevention effort with local groups, if man-caused forest fires are to be effectively reduced. A review of the reported causes of fires emphasizes this need.

Consistently over the past several years the major causes of forest fires have been incendiarism, debris burning, and smokers. Last year was no exception: 35 percent of the fires on protected lands were of incendiary origin; debris burning caused 22 percent, and smokers 20 percent of the total number of fires. Other causes were neglected campfires, lumbering and railroad operations, and miscellaneous. Lightning caused only 6¼ percent of the fires nationwide, although it caused a higher proportion of those occurring in the national forests of the Western States.

Cooperative Forest Pest Control on State and Private Lands

The Forest Pest Control Act of 1947 authorized a broad program for the control of destructive insects and diseases attacking the forests. The Secretary of Agriculture in 1952 asked individuals representative of the various phases of forestry to serve as consultants on questions arising in connection with the Department's activities under this act. The advisory group of six members met in May 1952 for the purpose of organizing, and again in December to review the present situation, to discuss policies, and suggest approaches to surveys, research, and control.

The Secretary of Agriculture is authorized by the Forest Pest Control Act to cooperate with the States and private landowners in insect and disease control on non-Federal lands. State Foresters are

taking an increasingly active part in the detection and control of forest pests. The Association of State Foresters at its meeting in 1952 created a Forest Pest Committee of five members to guide and advise on policies and action regarding forest insect and disease control, primarily on State and private lands.

Several States have enacted legislation which enables the State Forester to cooperate effectively in projects for control of insects and diseases. A few of the State forestry departments have been active in control work for several years. Many States are hampered, however, by lack of suitable authorization to do control work on private lands.

In some of the States, organized detection service has been set up in which the State Foresters' field organization, industrial foresters, and other field foresters participate. The cooperating field foresters provide good coverage through observations as they carry on their usual activities. There is need for additional training for these men, however, to help them spot infestations in their early stages.

The formation of local or statewide forest pest control committees has proved to be effective in developing coordinated forest pest control action, particularly where small private ownerships are involved.

Flood Prevention

The Secretary of Agriculture's Memorandum 1325 effected certain changes in assignment among agencies handling flood-prevention activities in the Department under authorization of the Flood Control Act of 1936 and its later amendments. The Forest Service's responsibilities include the making of preliminary examinations and surveys, the installation of works of improvement, and collaboration in river basin reports, on all national forests, on range areas adjacent to national forests, and on all other forest lands within a watershed or basin. The Forest Service cooperates and enters into agreements with and utilizes the services of State forestry agencies for these purposes, when State and private forest lands within a watershed or region are affected.

In 1953 Forest Service work on flood-prevention surveys in upstream watersheds was substantially curtailed. The personnel engaged in this work was reduced by 40 percent below that assigned to the work in 1952. Three upstream watershed flood-prevention surveys were completed, however, and reports submitted to the Secretary of Agriculture during the year. These covered the Santa Ana River-San Gabriel River and the Santa Clara River-Ventura River-Callegras Creek groups of watersheds in California, and the Virgin River watershed in Utah, Arizona, and Nevada. Field work was completed during the year on flood-prevention surveys for three additional groups of watersheds—the Salt River in Kentucky, the Merrimac in New Hampshire and Massachusetts, and the western-slope streams of San Diego County in California. In addition to these, work was in progress on 10 other flood-prevention surveys under Forest Service direction, and the Forest Service also collaborated with the Soil Conservation Service on forest-land phases of 20 flood-prevention surveys for which that agency was responsible.

River basin programs

The Forest Service continued its cooperation with other Department of Agriculture agencies and with the land-grant colleges in preparing a comprehensive program for the development of the agricultural and land resources of the Columbia River Basin.

Early in the year, House Document No. 530, "Supplemental Report, Missouri River Basin Agricultural Program," was released. This document included material contributed by the Forest Service working cooperatively with other Department agencies in the Missouri Basin.

In the Arkansas-White-Red River Basins and in the New England-New York States the Forest Service continued to work with other Federal agencies and with the States in developing comprehensive and integrated programs for flood prevention and the conservation and utilization of land, water, and related resources.

Progress on flood-prevention projects

Work continued in each of the six project areas in which the Forest Service is participating in flood-prevention work, as authorized in the 1944 Flood Control Act. In cooperation with the States concerned, fire-protection measures have been installed in the Coosa (Georgia) and Potomac (Virginia and West Virginia) River watersheds. A special plan to guide and expedite fire suppression was completed for the steep, hazardous brush areas in and adjacent to the Angeles National Forest, in the Angeles River watershed in California.

Installation of the fire-protection improvements authorized in the flood-prevention program is almost completed in the Santa Ynez River watershed in California. These improvements are located in the mountain area above the Cachuma Reservoir now nearing completion. The improvements are designed to afford increased protection to the reservoir from sedimentation, by maintaining an unburned, soil-stabilizing plant cover on the watershed.

Intensified fire-protection measures in the Los Angeles and Santa Ynez watersheds include the use of highly trained, fast-moving crews, which have quickly suppressed many fires before they could become major conflagrations.

In Mississippi organized fire protection has been extended through Federal-State cooperation to all but four counties in the Little Tallahatchie-Yazoo River watershed. In these four counties much work has been done to help the citizens obtain countywide fire protection. Flood Prevention Project foresters have cooperated directly with the State Forester in suppressing fires, and in training emergency fire crews to be available and effective during critical periods of fire danger. The rate of tree planting to reduce erosion in these watersheds is expanding to the limit of available planting stock. Nearly 25,000,000 trees were planted during the 1952-53 season. Most of this planting was done on privately owned lands with the cooperation of landowners and timber operators. Voluntary fire protection is improving as tree planting increases and landowners recognize the long-term values in their tree plantings. The application of good forest-management practices, guided by project foresters, is gradually

increasing, and the importance of this work to landowners and its relationship to flood prevention is being recognized more widely each year in the watershed area.

FOREST RESEARCH

Twenty-five years ago, recognizing the vital need for sound knowledge in meeting the forest, range, and watershed problems of the United States, Congress passed the McSweeney-McNary Forest Research Act of 1928. This act authorized and directed the Secretary of Agriculture

“ . . . to conduct such investigations, experiments, and tests as he may deem necessary . . . to determine, demonstrate, and promulgate the best methods of reforestation and of growing, managing, and utilizing timber, forage, and other forest products, of maintaining favorable conditions of waterflow and the prevention of erosion, of protecting timber and other forest growth from fire, insects, disease, and other harmful agencies, of obtaining the fullest and most effective use of forest lands, and to determine and promulgate the economic considerations which should underlie the establishment of sound policies for the management of forest land and the utilization of forest products . . . ”

This broad-gage directive has been the charter for the development of a nationwide forest and range research program that has continued to gain momentum during these 25 years. Under this program, the Forest Service now has in operation a national system of 11 regional forest and range experiment stations in the United States, a research center in Alaska and a tropical forest research center in Puerto Rico, and a national Forest Products Laboratory in Madison, Wis.

The McSweeney-McNary Act is also a charter for cooperation in the research program. As forestry has become a going, profitable business and the need for a scientific basis for sound forest, range, and watershed protection and management has been recognized, there has been more and more cooperative participation by State and local agencies and private organizations and companies in forest research projects.

Local and regional advisory committees utilized over the years, together with a recently established National Advisory Committee, are functioning to stimulate cooperation and to assure desirable balance and coordination in the research program. Advisory committees have emphasized the need for research to serve the various phases of multiple-use forest management.

Forest-Management Research

The forest-management research program of the Forest Service is aimed at improved forest production. First of all there is a search for new scientific facts related to the growing of trees and forests; and secondly, a testing of the practical application of these findings to the actual operation of forest properties. The examples of advancements made during the past year given in the following paragraphs illustrate the broad front over which this research program operates.

Seed dissemination gives clue to desirable cutting methods

First-year results of seed-dispersal studies on the Coram Experimental Forest in Montana showed that both larch and Douglas-fir seeds were scattered a maximum distance of 660 feet from the closest timber. However, dispersal was insignificant in quantity beyond 260 feet for Douglas-fir and 400 feet for western larch. These early results came from clear-cutting tests aimed at determining the maximum sized opening that will restock satisfactorily within a 5- to 10-year period.

In another study—this one in lodgepole pine, also in Montana—the dispersal of seed more than 250 feet beyond a timber edge was found to be very limited. Not more than 6 percent of the seed was dispersed farther than 70 feet from timber into clear-cut openings. Thus clear-cut strips which depend upon seeding from the sides must be narrow (probably not to exceed 130 feet) for adequate lodgepole pine seed dissemination.

The distance of effective seeding in the Douglas-fir region of Washington was determined by recording the reproduction obtained in small group cuttings as compared with a large clear cutting. Seedling counts made 5 years after logging point out that excellent regeneration resulted from the small group cuttings, but that for the large clear-cut tract, satisfactory seeding was confined to parts of the area within 500 feet of the timber edge. Hemlock was more widely distributed than Douglas-fir.

Seed-dissemination studies are also being carried out in Arkansas. Sweetgum seed does not travel as far from the parent tree as many people believe. The Arkansas findings have at least two practical applications. Where hardwood-control measures are being carried on to favor the pine component of pine-hardwood stands, all seed-bearing sweetgum should be eliminated from the stand and in a border zone of 600 feet. On the other hand, where a harvest cutting of sweetgum is being made to reproduce the forest on soils well adapted to that species, sweetgum seed trees should be spaced not much farther apart than 100 feet.

Reducing windfall losses

Severe storms of the past few years have demonstrated in no uncertain terms that windfall can be a major cause of mortality in forest stands. On the Oregon Coast Range alone, one storm in December 1951 blew down 3.7 billion board feet of merchantable timber.

During 1952, a preliminary study of the pattern of windfall was carried out at the Cascade Head Experimental Forest and at other locations in the Oregon Coast Range to explore management methods that will minimize windfall losses. The findings provide good evidence that wind damage associated with clear cutting can be greatly reduced in the Coast Range by using a modified "progressive strip cutting" system, by minimizing or eliminating exposed north and east cutting boundaries, and by carefully selecting windfirm cutting lines.

A study of different methods of logging spruce-fir stands on the Fraser Experimental Forest in Colorado has shown that windfall, the greatest source of damage to cutover timber, can be reduced by as much as 100 board feet per acre per year. Removing groups of trees rather than cutting by a uniform individual-tree-selection system—the

method commonly used in the past—not only leaves timber more wind-firm but is followed by a greater quantity of natural regrowth.

Forest tree improvement

Increasing competition for high-quality timber brings into sharp focus the need for full productivity of forest land. As a result, reforestation of idle land proceeds at an increased tempo. The demand for planting stock can only be satisfied with correspondingly large quantities of seed which, quite naturally, are usually obtained where most abundant and cheapest. Cones are often collected only from the prolific seed-producing trees that are easiest to climb, without regard to vigor, quality, or disease resistance of the parent trees. This practice, plus the "high-grading" of natural stands for the best trees, leads to degeneration of the crop. Thus landowners while stimulating reforestation efforts at present may be penalized in the future by the slow growth of inferior stands.

The genetic quality of the present forests can be maintained and those in the future improved by (1) establishing new stands by planting with seed from the best trees in the best stands adapted to a given locality, (2) making tests, with seed or grafted material of the best trees, stands, and races, to determine the best types and (3) starting a program of tree breeding to create new types.

Several years ago the Southern Forest Experiment Station demonstrated that serious losses in potential growth rate of planted loblolly pines resulted from using seed too far from its point of origin. For example, seed collected several hundred miles away and planted at Bogalusa, La., gave plantations that yielded only 40 percent as much wood as plantations from local seed. A knowledge of the correct geographic races to plant in different areas may bring very large rewards in timber yields. In order to determine the safe limits, a cooperative seed-source study was started in 1950 and carried through to field planting in 1952 with longleaf, slash, loblolly, and shortleaf pine from all parts of the South and Southeast. This study, carried out under the sponsorship of the Southern Forest Tree Improvement Committee and supervised by the Southern Forest Experiment Station, involves a total of some 300 private, State, and Federal cooperators, 16 Southern States, 19 nurseries, and 57 outplanting locations. This is perhaps the largest seed-source study ever undertaken in the world.

The attempt to obtain better strains of slash, longleaf, loblolly, and shortleaf pine through individual tree selection is being carried out in cooperation with the Ida Cason Callaway Foundation in Georgia. Progeny of some outstanding mother trees, even though the male parent is unknown, are as much as 50 percent taller at the end of one growing season in the nursery than those from other trees from seed of commercial source. Likewise 1-year-old western white pine progenies of known parentage have been found to reflect inherent vigor of their parents. The latter tree-breeding studies, aimed at improving disease resistance, growth, and form, are being conducted at the Northern Rocky Mountain Forest and Range Experiment Station by the Forest Service in cooperation with the Bureau of Entomology and Plant Quarantine and the Bureau of Plant Industry, Soils, and Agricultural Engineering.

At Lake City, Fla., evidence just obtained shows conclusively that the yield capability of oleoresin, the source of naval stores products, is an inherited character in longleaf pine. This study, begun in 1935, indicates the long-term nature of some phases of forest genetics work and emphasizes the need for an early attack on fundamental problems.

At the Institute of Forest Genetics of the California Forest and Range Experiment Station, the breeding program has produced more than 70 different hybrid combinations. In its work of exploring and exploiting the genetic variability of the different pine species, new crossings are attempted each year. Last year some 49 different species combinations were attempted, including 30 first generation crosses, 4 backcrosses, 7 three-species crosses and 2 four-species crosses. Thus almost one-third of the new crossings used hybrids as one of the parents. As more and more hybrids come into flower bearing, the percentage of such crossings will increase.

Converting poor hardwood stands to pine

It has long been recognized in agriculture that maximum farm income can be obtained by growing crops best suited to the soil and climatic conditions present. Certain crops do best on light sandy soils, others do best on heavy soils. When a variety of growing conditions occur on a farm the wise farmer plans his crops to make the most of his land.

The wisdom of such practice has also become apparent in forestry. In the widespread Central Hardwood Region of the United States, the oak-hickory forests occupy many different kinds of soils. On some they do well and produce valuable stands. On others, especially the more sandy soils, the ridge tops, and drier situations, they yield little although they occur there naturally. Moreover, low-grade hardwoods are abundant but softwoods are in short supply; hence there is an urgent need to find suitable softwoods that can be grown on the land. Studies by the Central States Forest Experiment Station are showing that pines can be planted and will make good growth on soils where the hardwoods do poorly. The problem is to find the right species and strain for a locality, a tree that is hardy and disease resistant. Progress has been made in introducing pines from adjacent areas. Such introductions have not always been free from insect and disease attacks and, as recent results in Arkansas show, it is highly desirable to get seed from comparable climatic zones. All this suggests the need for studies of genetics and tree breeding in order to develop thoroughly satisfactory strains for this region.

Research in Forest Fire Control

Improving the protection of wild-land values from fire through use of modern technology is the purpose of the Forest Service's program of forest-fire research. The rapid increase in commercial values of productive timberlands and the vital importance of forests for watershed protection call for more intensive methods in protecting these valuable properties. Federal, State, and private protection agencies are in great need of more technical information for use in improving the effectiveness of their services.

During the past year a number of investigations were under way to help fire-control officials anticipate the size of the fire-fighting

job at all times. Statistical studies were continued, designed to bring out the lessons to be learned from past experience with various methods, policies, and systems of fire control. Other investigations included studies of fire damage to permit better appraisal of losses; experiments in maintaining firebreaks by use of chemicals, and development of methods for systematically testing the efficiency of fire equipment in different combinations.

Some highly technical studies were made on the thermal and other physical qualities of common forest fuels, to establish exact relationships and to bring about a better understanding of just when and how they become extremely susceptible to fire.

Progress in various phases of these activities was reported in 14 reports or publications issued during the year.

New cooperative studies

A new project undertaken in cooperation with the State universities, State foresters, and private forest-protection associations in Idaho, Montana, and Washington looks to the development of better methods of reducing fire hazards from logging slash, and other measures to provide better protection for cutover lands in the Northwest.

A cooperative project also has been started with the Munitalp Foundation, Inc., to study the nature and development of fire-setting lightning storms in northern Idaho. The Weather Bureau is cooperating in investigations on the effects of unstable atmospheric conditions on the spread of fire. During the year new evidence was found that the condition of the atmosphere in the vicinity of a fire can have a pronounced effect on how fast the fire spreads. The investigations under way give promise that dangerous atmospheric conditions eventually can be predicted in advance, once their makeup and effect have been fully established.

Forest and Range Influences

The influences-research program of the Forest Service includes both basic and applied research. Basic research is primarily concerned with discovering the physical and biological processes that affect the interrelations of soil, plants, and water. Applied research involves studies to determine answers to such questions as the specific effects of land-use practices on the behavior of watersheds and the best methods of stabilizing damaged areas. It also includes the design and testing of improved cutting, logging, grazing, roadbuilding, and other practices to reduce harmful erosion, flood flows, and debris movements, and to increase the yield and quality of water supplies.

Runoff and streamflow reflect watershed recovery

Significant changes in streamflow have occurred over the past 15 years on two small watersheds in Utah's Wasatch Mountains. During the disastrous mud-rock floods in 1930, Parrish Creek, which leaves the mountains near the valley town of Centerville, was scoured to bedrock. From 1936 to 1942 it yielded about 1 inch more annual flow than adjacent Centerville Creek. Since then, however, its flow has decreased to about 1 inch below that of Centerville Creek. Scientists attribute the change in relative flows to the increasing use of water by the vegetation which has come back along the previously scoured channel of Parrish Creek.

Well-stocked forests favor more snow and slower melt

In the Northeast, where snowfall is often heavy, well-stocked forests appear most effective in promoting favorable water yields and reduced flooding. The greatest amount of snow accumulates in well-stocked hardwood stands. Second greatest is on abandoned lands and former clear-cut areas containing a dense cover of small trees or brush; third, in spruce, balsam, or pine stands; fourth, on hay and pasture lands; and the least amount on bare, cultivated fields. The rates of snow melt, however, appear lowest under conifers, next under hardwoods, and highest on open fields. The soils of ungrazed, lightly cut hardwood forests also are comparatively free of types of frost that prevent melting snow from percolating readily into the ground. On the other hand, the "concrete" frost that usually occurs in open fields obstructs percolation, causing rapid surface runoff of melting snow and spring rains.

More light on watershed logging

Timber operations in California have often caused serious surface runoff and erosion hazards due to the logging roads, equipment, and skidding practices employed. Research workers are cooperating with national-forest officers in preparing a guidebook showing how to recognize potential hazards in advance so that less damaging methods can be applied. This guidebook will be based partly on detailed observations of logging operations, and partly on the results of basic investigations into the effects of land-use activities on soil and water relations.

Special cutting practices aid fishing

That partial removal of streambank forest growth may actually improve the habitat for fish is indicated by experiments now under way in cooperation with the State Fish and Game Department of North Carolina. After the felling of trees in one case and only the undergrowth in another case, water temperatures remained within optimum limits for fish life. On minor watercourses that are too small to support fish, the increased temperatures and sunlight that result from the partial removal of vegetation may stimulate the growth of aquatic organisms. These organisms are washed down to the larger streams and furnish increased food for trout.

Facilities at the experimental areas where forest influence studies are conducted are especially suited to cooperative projects with State fish and game departments. Such projects are welcomed by the Forest Service because they lead to a more practical understanding of the multiple-use possibilities of forest and range management.

Denuded lands successfully revegetated

Years ago, fumes from copper smelting killed all the plant growth on large areas of once-forested steep slopes above the Bureau of Reclamation's Shasta Reservoir in northern California. The resulting sedimentation has threatened the usefulness of this giant storage reservoir. During the 1930's ponderosa pine and other trees were planted in an effort to stabilize the shifting granitic soils. Later, small brush dams were placed in the gullies. Recent examinations show that the soil within the tree plantations has largely been stabilized beneath a matted litter of pine needles. But on adjacent unplanted sites the

natural growth of manzanita and other native shrubs has not been sufficient to protect the soil and consequently many gully bottoms are filled with eroded materials and the sides of the gullies remain exposed to further soil losses.

Tree planting has thus proved its worth for reclaiming the 32,000 acres that still remain unprotected.

New method improves flood predictions from treated watersheds

The effects of watershed-improvement measures on floods can now be predicted more accurately by a method devised by Forest Service hydrologists and foresters in the Northeast. Starting with records of previous rainfall and flood discharges, the amount of rainwater that actually enters the ground and passes through the several layers of the soil is determined by soil-moisture sampling. The comparisons of treated and untreated areas consider such factors as the amount of soil moisture already present before precipitation, the losses of water by evaporation and plant use during given storm periods, and the variations among the different soil layers in their ability to store and pass excess water downward into the streams. The difference between the amount of rain that reaches the ground and the net amount that enters and passes through the soil represents the volume of flood-contributing surface runoff. This runoff is then related to the rise in streamflow as recorded by the stream gage. The method has now been adopted by the New England-New York Inter-Agency River Basin Committee as a standard technique for evaluating the flood-reduction effects of watershed-improvement programs.

Cooperative relations

At the request of the Conservation Foundation, the Forest Service loaned a research specialist to that organization to prepare a semi-technical book bringing together the knowledge on the basic relations of vegetation and water yield for each major climatic and soil region of the United States. This book is scheduled for publication early next year.

Hydroelectric power companies, municipalities, and industries continue to request technical advice on the management of their watershed lands to better attain regulated flows and high-quality supplies. Requests for assistance by the Department of the Interior's land-managing agencies are being met to the extent that funds permit. The soil-moisture investigations conducted at several localities in cooperation with the Army Corps of Engineers continue to provide information of fundamental value.

Range Research

Cooperative approach to California brush problem

Cooperative research of the Forest Service, the University of California, and the State of California has combined specialized training along several different lines towards developing better methods of converting low-value brush fields to grass. The program is aimed at improving forage production while also maintaining a protective vegetation on watersheds to prevent serious soil erosion.

Research to date shows that soils typically associated with woodland-grass vegetation can be improved by burning with ample provi-

sion for revegetation. Soils associated with chamise-chaparral vegetation, especially shallow soils on steep south slopes, do not respond as well to such treatment for revegetation. "Area ignition" and "brush mashing" techniques have been developed, making it possible to obtain clean, orderly burns in periods of low fire hazard. Species and methods have been found for quickly restoring a cover of vegetation that will give a high forage yield, give ample soil protection, and control brush seedlings.

Big game and livestock

Cooperative studies of forage use by big game are providing information necessary to integrate the management of deer and elk herds with management of livestock and other uses of the land. The urgent need for such information is shown by studies of 58 deer herd ranges in Utah. It was found that 38 of these had problem areas where important deer forage had been depleted by overgrazing, either by deer, by livestock, or by both kinds of animals.

The Utah studies showed that the deer compete with both cattle and sheep for forage. Here grass, mostly bluegrass, a valuable forage for livestock, was found to make up 90 percent of the spring diet of mule deer. Forbs and browse were the main summer diet, the forbs being most important in early summer while they are still succulent. After midsummer, browse use exceeded forb use. During fall and winter, browse was the main diet, more than 80 percent of it being composed of sagebrush, cliffrose, and bitterbrush.

In Oregon a 7-year study gave tentative levels for the proper winter use of several important browse species on big-game ranges. The results suggest how much of the current growth of snowbrush, ceanothus, curleaf mountain-mahogany, antelope bitterbrush, and other browse plants can be utilized on good sites and on poor sites without depleting the browse forage.

In California the State Department of Fish and Game and the Forest Service have started cooperative studies to develop methods of restoring browse species on ranges where they have been depleted. Methods of seeding bitterbrush are also being tested cooperatively by the Forest Service and the Idaho Fish and Game Department.

Improvement of salt desert-shrub ranges

Eighteen years of grazing-management research at the Desert Experimental Range in Utah have developed management methods that can greatly improve forage production and double the net income from sheep that graze salt desert-shrub ranges. The better stand of vegetation resulting from proper management makes possible greater wool production, higher lamb crops, and lower death losses, all of which contribute to greater income for the sheep operator. The better vegetation also resists the invasion of undesirable plants such as Russian-thistle and small rabbitbrush. The research results apply in varying degrees to 42 million acres of salt desert-shrub ranges in the West, which provide 6 months of winter grazing each year for 4 to 5 million sheep. The recent widespread invasion of these ranges by halogeton, a plant poisonous to both cattle and sheep, has focused attention on the importance of these lands and the need for their improvement.

Reseeding rangelands in the Southwest

Guides to the use of crested wheatgrass for seeding rangelands in the Southwest have been published in Farmers' Bulletin No. 2056. Crested wheatgrass has had wide use in cooler sections of the West but only limited use in the Southwest. It has been found adapted, however, and is recommended for seeding depleted areas throughout the ponderosa pine range area. It may also be successfully seeded on better sites in the pinyon-juniper and big sagebrush range types. Grass yields range from 520 pounds of air-dry herbage per acre on poor sites to over 1,000 pounds per acre on the better sites. Grazing studies on ranges reseeded to crested wheatgrass in New Mexico show that a degree of grazing that removes about 35 to 55 percent of the current herbage growth results in average daily gains for the cattle of nearly 2 pounds per head, while preserving the stand of grass. This is considerably more beef than can be obtained on unseeded depleted range in the same area.

Control of undesirable range plants

Results of past research on the mesquite problem in the Southwest have been summarized and published as Department of Agriculture Circular No. 908. Mesquite occurs on some 70 million acres of rangeland in the Southwest. It is estimated that over half the rangeland now occupied by mesquite has been invaded since 1850. Also, the original stands have become thicker. Mesquite advance is attributed to a combination of influences, including cessation of range fires, heavy grazing, drought, and dissemination and planting of seed by livestock, birds, game animals, and rodents. Mesquite control offers good possibilities as a range-improvement measure. On a range with moderate precipitation and a good stand of perennial grasses, killing velvet mesquite was found to double the yield of the grasses within 3 years. Mesquite can be economically controlled through grubbing or hand application of sodium arsenite or petroleum oils. Herbicides such as 2,4-D and 2,4,5-T show promise, but further studies are needed to determine more selective chemicals and techniques of application.

Forest Economics

The Forest Survey

Timber-production plans and programs of the Forest Service, and those of other public agencies and private timber owners and operators, require basic facts on timber supplies, timber growth and mortality, timber cut for lumber and other products, and prospective needs for timber. Such information is obtained by the Forest Survey.

Since the Survey was started in 1930 a total of 450 million acres, or more than two-thirds of the estimated 622 million acres of forest land in the United States, has been initially covered in the field for detailed forest-resource information. Since 1946, 167 million acres of forest land also has been covered by resurveys to bring older surveys up to date in the most actively logged areas, such as the South and Pacific Northwest. These resurveys have shown varying trends in the timber-supply situation in different States.

During fiscal year 1953, initial surveys covered about 26 million acres of forest land in California, Idaho, Indiana, Ohio, New York,

Pennsylvania, West Virginia, and Maryland. Resurveys covered about 36 million acres in Oregon, Washington, Minnesota, Wisconsin, Michigan, Alabama, Louisiana, Texas, Georgia, and North Carolina. Cooperating public and private agencies in eleven of these States gave substantial financial or other assistance in speeding up and intensifying the Forest Survey. State analytical or statistical reports were issued for Arkansas, Indiana, Kentucky, West Virginia, Tennessee, and Vermont.

Special economic studies

A study concerning the feasibility of establishing pulp mills in eastern Montana indicated that there is sufficient timber in the national forests of this area and suitable water supplies east of the Continental Divide to support the permanent operation of several pulp mills. Development of pulpwood resources in this area, however, would require intensification of forest management, the construction of many miles of timber access roads, and measures to guard against water pollution.

A study of financial maturity of shortleaf and loblolly pine in Arkansas and Louisiana indicated the gross and net values of trees of different classes, timber-production costs, and rates of value increase for trees of different vigor classes utilized for sawlogs. From these data simplified marking rules for use in the woods have been established. The study showed that trees that are improving in grade or log length usually are not financially mature until the growth rate declines to a very low point or trees reach at least 25 inches in diameter.

In the Southeast, a study was begun to determine the economic feasibility of marketing logging waste and sawmill residues for pulpwood, including determination of the most efficient methods for utilizing and transporting such material. In an area in South Carolina selected for study, 50 thousand cords of mill waste suitable for chipping and 36 thousand cords of logging waste were produced annually through the operations of 147 sawmills. Logging waste ranged from 0.3 to 3.2 cords per acre. An analysis to determine minimum operable volumes is now under way.

In order to help the small timber owner and those who advise him on tax problems, the Forest Service published Agriculture Handbook No. 52, "The Small Timber Owner and His Federal Income Tax." In nontechnical language, this handbook describes the ordinary-income and capital-gains methods of reporting receipts from sales of timber and forest products, tax treatment of timber losses from fire or other casualty, and the treatment of the costs of forest ownership and operation.

Forest Products

The forest-products research program of the Forest Service, centered at the Forest Products Laboratory in Madison, Wis., seeks to develop new products, to lower the costs and improve the serviceability of existing forest products, to find ways to reduce the amount of unused residues in forest and mills and find useful outlets for unavoidable residue, and to aid in the solution of national, regional,

and local forest products problems of all types. Some examples of the past year's activities follow.

Fundamental approach to semichemical pulping factors

A fundamental approach has been made to the problem of classifying various woods with respect to their semichemical pulping behavior. In this study pulping data on a number of woods were classified and analyzed. The main variables—the properties of the wood itself, and its pulping characteristics and pulp yield—were used to develop a “pulping index.” Further development of the index will make it possible to predict the semichemical pulping behavior of any wood without actually making lengthy and costly pulping tests.

Heating veneer logs electrically

Hardwood veneer logs must usually be heated before they are cut into veneer. This heating is costly and time consuming, requiring 1 to 2 days or more in steam or water. Softwood logs are usually cut without heating, in the interest of economy, but here too, the improved quality of the veneer obtained from heated bolts makes heating desirable whenever it can be justified economically. A promising new method of heating veneer bolts quickly and economically has been developed. A high-voltage electric current is passed through the green bolts, which are heated because of the resistance to the passage of the current. Bolts requiring 2 days of heating in steam or water have been heated throughout in 2 to 4 hours by the new method. The cost of electrical heating is low—another advantage.

Strength of wood at low temperatures

Assertions have frequently been made that wood becomes weak and brittle when continuously exposed to very low temperatures. Recent Laboratory investigations at temperatures as low as -300° F. disprove this. In fact, some important strength properties of wood are increased, compared with those at room temperature. Increases range from 40 to 150 percent depending on the property and the species involved. Fundamental knowledge of the behavior of wood at very low temperatures is applicable to the use of wood for construction, containers, and shelters in the arctic regions, and for such nonmilitary uses as wood supporting members and insulation for tanks carrying liquefied gases at -275° F.

Preservation of wood in glued products

Glued wood products in the form of plywood, laminations, and other built-up products are being used more and more under adverse conditions of exposure. This has created the need for information both on the preservative treating of glued material and on the gluing of treated wood. The Forest Products Laboratory tested products glued with several common synthetic-resin adhesives and subsequently treated. Seven different commercial wood preservatives and one fire retardant, applied by pressure, had no harmful effects on the strength and durability of the glue bonds. The glue joints were evaluated shortly after treating and again after 2 and 6 years of aging.

Progress has also been made in developing techniques for gluing wood that has first been treated with preservative. The Laboratory

demonstrated that treated wood can be successfully glued, and devised a practical method of producing thoroughly treated glued-up members for service under conditions of high decay and insect hazard.

Fire hazards in houses

Fire hazard to human life is closely associated with the rate at which flames spread through a burning building. A method of testing the rate of spread of flame over the surface of combustible materials is being developed at the Laboratory. The results of these studies will have a very practical bearing on building-code specifications of materials and the fabrication of construction materials less hazardous to human life. They are particularly important in connection with the Nation's housing program.

Simplified house paint maintenance

A house paint maintenance study on representative exterior paints and painting systems that was started in 1936 has reached a significant stage. The results reveal that painting too frequently or too generously produces paint films of excessive thickness. Excessive film thickness, in turn, causes such excessive checking, scaling, and peeling that complete and expensive removal of the old paint is necessary. These findings are of importance in two respects. They indicate repainting schedules that should result in decreased painting cost and improved paint service to the householder. They also indicate means of evaluating paint service in shorter periods than the 16 years required for this study.

Double-diffusion treatment of cooling towers

The cooling tower is an important link in many industrial operations. In some cases repair and replacement of cooling tower parts has been necessitated by early decay as well as by chemical deterioration. Where decay is the cause of deterioration, the double-diffusion method of preservative treatment seems to be a logical method, if not the only practical method, whereby cooling towers may be effectively treated in place. During the past year the Forest Products Laboratory cooperated with a manufacturer and two users of cooling towers in experimental double-diffusion treatments in which first one chemical and then another was flowed over the wood in water solution to react and form a water-insoluble preservative compound. Samples of the treated wood removed and analyzed for preservative retention showed fair penetrations in new unweathered pieces and good penetration in older pieces that had been in service for a number of years. From time to time additional samples will be removed to determine the permanence of the treatment under normal cooling tower service conditions.

The entire cost of the double-diffusion treatment was about 7 percent of the replacement cost of the cooling tower. Replacement cost may run as high as a quarter of a million dollars. Service life varies from 4 years under severe conditions up to 20 years; failure after about 7 years of service is common. With a service life in this range only a very moderate extension of life would make treating profitable.

The double-diffusion treatment developed by the Forest Products Laboratory was originally intended for use on green fence posts.

ADMINISTRATIVE MANAGEMENT AND FISCAL CONTROL

To get a dollar's worth of value for every dollar spent has been a traditional objective of the Forest Service ever since its earliest days. The effort to find more efficient and more economical ways of doing things has continued for nearly half a century.

One of the means by which the Forest Service has sought to attain greater efficiency at less cost is through decentralization and delegation of authority. A decentralized type of organization and administration, in which the great bulk of the work is directed from field offices, results in most decisions being made by field officers on the ground. Overhead costs have been kept low. Of the total employment during a normal field season, less than 2 percent is in the central office in Washington. The Washington headquarters office today, in fact, has only 40 more employees than it had in 1908, although the volume of business then was a small fraction of what it is now.

During the past few years the workload of the Forest Service has increased greatly. For example, the volume of timber cut from the national forests has more than doubled in the past decade. A succession of dry years, together with increased numbers of people in the forests, has intensified the fire control problem. Use by recreationists and sportsmen is much greater. In spite of this, the total number of Forest Service personnel on regular activities was smaller (by 727 man-years of employment) last year than it was 5 years ago.

Since overtime payment is costly, overtime work is officially ordered only when absolutely necessary. The Forest Service cannot legally sanction or recognize work done voluntarily in excess of the legal work hours. Nevertheless, it cannot help being proud of the spirit of public service that prompts many of its employees on their own initiative to disregard regular hours and put in much extra time in getting the job done. Much of the accomplishment in Forest Service activities actually results from voluntary overtime, of which there is no record and for which the employees receive no compensation.

Organizational changes

An organizational study resulted in decision to combine 14 national forests and consolidate offices, in order to obtain greater economies in administration and more effective utilization of improved transportation and communication facilities. Steps already have been taken to effect these combinations. Three of them were well along toward completion as this report was prepared: the supervisors' offices of the Pisgah and Nantahala National Forests in North Carolina to be consolidated; the Minidoka National Forest to be combined with the Sawtooth National Forest in Idaho; and the Crook National Forest to be eliminated and its lands added to the Coronado, Tonto, and Gila National Forests in Arizona and New Mexico.

It was also decided to combine the Southwestern Forest and Range Experiment Station, which had headquarters at Tucson, Ariz., with the Rocky Mountain Forest and Range Experiment Station with headquarters at Fort Collins, Colo. An important research center will be maintained at Tucson.

In two of the Forest Service regional offices, combinations of divisions have been made for greater economy. Further savings should result from many other smaller organizational changes.

Personnel

Training

The Forest Service has always given much attention to the training of its permanent career people in order to improve their job performance and develop them for broader responsibilities. Training is also necessary for the thousands of temporary seasonal workers employed each year. Most of the training has been of the on-the-job type.

During the past year the Forest Service started or reemphasized action along four major lines.

First, a system was started for evaluating the national-forest supervisors in their important responsibility of training, development, and discovering talent in employees.

Second, a special program was developed to make sure that professional probationers coming on the job from the Civil Service register will be properly assigned, trained, and appraised during their probationary year.

Third, training in techniques of inspection was encouraged at all levels of the organization. Training in inspection is not new, but the Forest Service is now giving it more emphasis.

Fourth was a measure aimed at developing more skill on the part of Forest Service members in the use of the written and spoken word. With the aid of the English and Forestry Departments of the Utah Agricultural College, a cooperative study was made of Forest Service communications problems. Every Forest Service region and experiment station will use the report of this study to improve in-Service training in communications.

Safety

The determined drive to eliminate accidents shows increasingly better results each year. Servicewide, the frequency of disabling accidents last year was only half of what it was 5 years ago. Scores of employees are thus being spared the unhappy—and often tragic—consequences of getting hurt on the job.

Recruitment

The Forest Service maintains close working relationships with forestry schools throughout the United States, from which it recruits professional trained foresters. These contacts are maintained in part through the Division of Education in the Society of American Foresters and in part through annual visits by Forest Service personnel officers to the schools. During these visits the personnel officers interview senior and graduate students who have taken the Junior Forester examination and are interested in careers in the Forest Service.

The deans of the forestry schools recommended to the Civil Service Commission in 1951 that subject-matter questions be included as a part of the Junior Forester examination, in addition to the general test given to all Junior Agricultural Assistant applicants. The Commission approved this recommendation, and 50 subject-matter (technical forestry and range) questions were included in the test given in November 1952. The use of subject-matter tests will continue. In April 1953 a study of the results of the tests was made by the Commission with the help of technical employees of the Forest Service.

As an outcome of this study, the selectivity of subject-matter questions will probably be improved.

Retirement

During the year 87 persons retired from the Forest Service. Their average age was 62.7 years, and length of service averaged 28 years. There also were 45 retirements on account of disability.

Fiscal Service

The Forest Service at the beginning of the year embarked on an intensive program to improve its fiscal management. Forest Service members worked closely with the Secretary's Office, the General Accounting Office, Treasury Department, and others. Studies in accounting operations, methods, and procedures are resulting in more efficient administration at less cost. Internal audit and controls have been strengthened. These studies will be conducted on a continuing basis in all fields of fiscal and accounting work and further improvement in efficiency is expected.

Statement of Receipts and Expenditures

National forests

Receipts from the national forests deposited to the forest reserve fund in fiscal 1953 amounted to \$74,732,468. In addition there was collected \$1,524,009 from national-forest lands that were within the former indemnity limits of the grants to the Oregon and California Railroad Co., and \$207,269 from Tongass National Forest in Alaska, both of which were deposited in suspense pending proper disposition. Including these amounts, total receipts were \$76,463,746. Of the forest reserve fund receipts, \$69,252,124 was from timber; \$4,415,862 from grazing; and \$1,064,482 from special land uses, waterpower, etc. Of the amount credited initially to the forest reserve fund, \$122,755 is returned to Arizona and New Mexico on account of State school lands within national forests and \$10,537 is derived from designated lands in the Superior National Forest for which special payment is made to the State in lieu of the usual 25 percent payment. Of the remaining \$74,599,176, 25 percent, or \$18,649,794, is paid to States for benefit of public schools and public roads of the counties in which national forests are situated; also, 10 percent of the same base amount and of the \$10,537, or \$7,460,971 in all, is appropriated to the Forest Service for roads and trails within national forests. From the remaining balance there is appropriated \$45,332 for payment to Minnesota on account of the designated area in the Superior National Forest and \$531,000 from grazing receipts of various national forests for range improvements on such forests.

Expenditures for national-forest operation, protection, and management were \$39,885,879. Additional expenditures from appropriations for forest roads and trails amounted to \$24,532,516 and for acquisition of national-forest land \$121,969.

Aid to States

Forest Service expenditures for cooperation with States and private agencies in fire control, planting, and assistance in forest practice were \$10,667,198.

Research and miscellaneous

Expenditures for research were \$5,415,908 and for flood control \$1,307,562.

A total of \$8,594,947 was also expended for fire control, slash disposal, improvement work, timber-stand improvement, and other work financed by outside agencies and from receipts authorized to be expended for specified purposes.

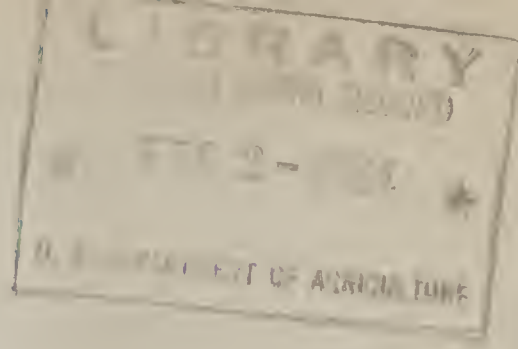
Services for other Government agencies from funds advanced or transferred by such agencies amounted to \$2,533,134, including \$173,673 for the Department of the Interior, \$1,365,508 for the Army, \$354,154 for the Air Force, \$240,366 for the Navy, \$176,453 for the Department of Commerce, \$131,660 for the Production and Marketing Administration (Agriculture) and \$91,320 for other agencies.

Total net expenditures were \$93,059,113. In addition, expenditures for which appropriations were reimbursed amounted to \$6,517,989. Expenditures were accounted for by objective and functional classifications under 88 separate appropriation titles.

The Forest Service handled the naval stores conservation program, involving payment to farmers of \$532,522 from funds of the Production and Marketing Administration.

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STATISTICAL SUPPLEMENT



REPORT OF THE CHIEF
OF THE FOREST SERVICE

1953

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Table 1. - AREAS WITHIN NATIONAL FORESTS AND OTHER PROJECTS
ADMINISTERED BY THE FOREST SERVICE
JUNE 30, 1953

States	Gross Area Within Unit Boundaries	National Forest Lands, ^{a/} and other lands under Forest Service Adminis- tration
	Acres	Acres
Alabama	2,435,749	621,660
Arizona	12,156,912	11,481,209
Arkansas	3,584,539	2,363,542
California	25,076,326	19,948,031
Colorado	15,232,996	13,735,052
Florida	1,244,229	1,075,250
Georgia	1,732,322	665,732
Idaho	21,569,944	20,276,342
Illinois	813,093	221,556
Indiana	725,640	119,447
Iowa	218,671	4,749
Kentucky	1,411,699	457,129
Louisiana	1,274,977	560,632
Maine	878,283	49,558
Maryland	4,318	1,110
Massachusetts	1,651	1,651
Michigan	5,161,057	2,558,802
Minnesota	5,041,832	2,713,330
Mississippi	2,776,143	1,048,632
Missouri	3,460,186	1,358,777
Montana	19,052,762	16,632,796
Nebraska	207,209	206,028
Nevada	5,378,726	5,062,197
New Hampshire	804,965	677,399
New Mexico	10,279,686	9,130,824
North Carolina	3,592,763	1,118,417
North Dakota	764,425	520
Ohio	1,454,982	104,848
Oklahoma	344,269	181,117
Oregon	17,378,011	14,818,830
Pennsylvania	743,999	472,022
South Carolina	1,423,339	587,383
South Dakota	1,403,357	1,119,979
Tennessee	1,531,797	591,275
Texas	1,716,965	658,081
Utah	9,009,453	7,881,426
Vermont	629,004	228,689
Virginia	4,019,002	1,444,927
Washington	10,740,356	9,679,606
West Virginia	1,832,868	903,613
Wisconsin	2,024,281	1,462,907
Wyoming	9,016,135	8,567,264
Total - States	208,148,921	160,792,339
Territories		
Alaska	20,777,294	20,742,416
Puerto Rico	186,182	33,113
Total - Territories	20,963,476	20,775,529
Grand Total	229,112,397	181,567,868

^{a/} Includes land utilization projects and other special areas administered by the Forest Service, and 294,103 acres in the process of acquisition for national forest purposes. Does not include 444,195 acres of land utilization project land under Forest Service custodianship but leased to states or state agencies, or administrative sites outside national forest boundaries reserved from the public domain.

Table 3. - QUANTITY AND VALUE OF TIMBER CUT ON THE NATIONAL FORESTS, BY STATES

FISCAL YEAR 1953

STATE	QUANTITY OF TIMBER CUT			VALUE OF TIMBER CUT		
	Sales	Land Exchanges	Total	Sales	Land Exchanges	Total
	MBM	MBM	MBM	Dollars	Dollars	Dollars
Alabama	43,092	..	43,092	726,549	..	726,549
Alaska	57,114	..	57,114	189,755	..	189,755
Arizona	180,790	..	180,790	1,696,636	..	1,696,636
Arkansas	61,841	1,331	63,172	2,107,367	24,149	2,131,516
California . . .	592,047	48,851	640,898	10,138,217	209,524	10,347,741
Colorado	127,456	6,658	134,114	567,620	44,688	612,308
Florida	53,781	..	53,781	618,328	..	618,328
Georgia	26,148	302	26,450	446,708	5,642	452,350
Idaho	319,051	5,892	324,943	3,226,399	11,482	3,237,881
Illinois	4,040	387	4,427	47,103	5,018	52,121
Indiana	949	..	949	12,188	..	12,188
Kentucky	12,710	29	12,739	149,103	250	149,353
Louisiana	44,710	..	44,710	512,334	..	512,334
Maine	588	..	588	11,141	..	11,141
Michigan	67,192	2,044	69,236	606,540	16,660	623,200
Minnesota	93,894	9,559	103,453	537,914	27,273	565,187
Mississippi . . .	82,282	..	82,282	1,254,286	..	1,254,286
Missouri	20,639	1,946	22,585	104,748	14,010	118,758
Montana	292,398	3,622	296,020	1,909,369	11,000	1,920,369
Nebraska	5	..	5	30	..	30
Nevada	420	..	420	1,606	..	1,606
New Hampshire . .	20,828	..	20,828	175,597	..	175,597
New Mexico . . .	58,535	5,009	63,544	517,324	34,582	551,906
North Carolina . .	34,233	190	34,423	501,672	7,760	509,432
Ohio	1,192	..	1,192	8,495	..	8,495
Oklahoma	2,040	64	2,104	33,444	1,600	35,044
Oregon	1,426,792	76,853	1,503,645	24,777,815	323,172	25,100,987
Pennsylvania . . .	8,876	..	8,876	162,551	..	162,551
Puerto Rico . . .	522	..	522	9,395	..	9,395
South Carolina . .	27,567	3	27,570	760,802	40	760,842
South Dakota . . .	29,270	..	29,270	231,563	..	231,563
Tennessee	16,698	..	16,698	288,111	..	288,111
Texas	94,264	..	94,264	2,128,720	..	2,128,720
Utah	31,730	331	32,061	168,059	2,098	170,157
Vermont	11,186	1,317	12,503	144,928	23,712	168,640
Virginia	23,175	235	23,410	197,978	2,906	200,884
Washington	981,245	12,432	993,677	13,854,079	96,621	13,950,700
West Virginia . . .	15,819	..	15,819	167,057	..	167,057
Wisconsin	46,245	1,524	47,769	360,729	24,401	385,130
Wyoming	70,272	140	70,412	374,777	2,400	377,177
Totals - 1953	4,981,636	178,719	5,160,355	69,727,037	888,988	70,616,025*
Totals - 1952	4,232,119	186,411	4,418,530	58,274,920	1,066,289	59,341,209*

*In addition, forest products not convertible into board feet were cut, the value of which was \$226,183 in 1953 and \$192,947 in 1952.

Table 4. - FOREST TREE PLANTING AND SOWING ON THE NATIONAL FORESTS, BY STATES

FISCAL YEAR 1953

State	Acres Planted and Seeded ^{1/}				
	Fiscal Year 1953	Previous Years	Total to Date	Lost From All Causes	Net Total to Date
Alabama	1,872	40,326	42,198	2,997	39,201
Arizona	290	1,041	1,331	311	1,020
Arkansas	194	14,530	14,724	4,900	9,824
California	4,952	43,755*	48,707	13,375	35,332
Colorado	335	67,245**	67,580	28,672	38,908
Florida	1,930	9,821	11,751	777	10,974
Georgia	205	3,496	3,701	57	3,644
Idaho	1,221	98,319	99,540	26,792	72,748
Illinois	2,572	30,878	33,450	2,179	31,271
Indiana	1,902	10,478	12,380	724	11,656
Kentucky	28	473	501	--	501
Louisiana	447	98,570	99,017	23,006	76,011
Maine	--	67	67	--	67
Michigan	5,620	531,144	536,764	152,960	383,804
Minnesota	2,582	126,521	129,103	32,055	97,048
Mississippi	4,269	132,228	136,497	5,947	130,550
Missouri	4,001	57,177	61,178	14,308	46,870
Montana	672	34,735***	35,407	11,500	23,907
Nebraska	133	29,686	29,819	13,823	15,996
Nevada	16	75	91	36	55
New Hampshire	--	1,153	1,153	145	1,008
New Mexico	291	1,042	1,333	420	913
North Carolina	558	6,269	6,827	345	6,482
Ohio	1,489	6,767	8,256	989	7,267
Oklahoma	--	57	57	57	--
Oregon	7,133	67,157	74,290	6,900	67,390
Pennsylvania	111	16,993	17,104	4,723	12,381
Puerto Rico	676	11,552	12,228	8,486	3,742
South Carolina	961	15,964	16,925	328	16,597
South Dakota	851	28,806	29,657	6,239	23,418
Tennessee	469	3,411	3,880	243	3,637
Texas	131	48,766	48,897	12,229	36,668
Utah	--	3,992	3,992	2,368	1,624
Vermont	13	1,307	1,320	--	1,320
Virginia	781	1,807	2,588	423	2,165
Washington	4,583	92,812	97,395	11,116	86,279
West Virginia	147	15,470	15,617	762	14,855
Wisconsin	1,072	219,910	220,982	51,854	169,128
Wyoming	380	6,319	6,699	3,406	3,293
Totals	52,887	1,880,119	1,933,006	445,452	1,487,554

*Adjustment (4157 acres previous years)

**Adjustment (-105 acres previous years)

***Adjustment (-11 acres previous years)

^{1/} Includes States where there was some direct seeding as follows:

State	Acres Seeded F.Y. 1953
Arizona	7
California	83
Florida	246
Idaho	11
Louisiana	100
Missouri	74
New Mexico	285
Oregon	376
South Dakota	229
Tennessee	240
Washington	420
Wyoming	60
Total Seeding	2,131

TABLE 5 - PAY PERMITS ISSUED AND NUMBERS OF LIVESTOCK PERMITTED
TO GRAZE UNDER PAY PERMITS ON THE NATIONAL FORESTS, BY STATES,
CALENDAR YEAR 1952

State	Cattle & Horses		Sheep & Goats	
	Permits Issued	Number Allowed	Permits Issued	Number Allowed
Alabama	1	20	-	-
Arizona	830	135,863	26	89,723
Arkansas	199	2,429	-	-
California	1,214	103,171	85	119,214
Colorado	1,816	150,442	519	591,805
Florida	25	2,754	-	-
Georgia	6	20	-	-
Idaho	1,954	108,925	390	626,085
Louisiana	40	1,384	-	-
Mississippi	98	1,611	-	-
Missouri	466	3,997	-	-
Montana	1,751	114,019	172	248,493
Nebraska	73	13,000	-	-
Nevada	276	55,822	46	132,849
New Mexico	1,820	73,371	166	89,554
North Carolina	25	71	-	-
Oklahoma	4	18	-	-
Oregon	834	70,473	105	148,491
Pennsylvania	7	24	-	-
South Carolina	36	526	-	-
South Dakota	603	23,003	20	12,982
Tennessee	11	98	-	-
Texas	83	1,832	-	-
Utah	3,254	108,052	686	476,520
Vermont	9	79	-	-
Virginia	18	180	5	196
Washington	470	19,162	29	38,931
West Virginia	79	1,049	23	1,202
Wyoming	1,029	104,164	234	423,478
Totals	17,031	1,095,559	2,506	2,999,523

Table 6 - ESTIMATE OF BIG GAME ANIMALS ON
NATIONAL FORESTS

SUMMARY BY STATES

As of June 30, 1952

State	Bear												Total Big Game	
	Antelope	Grizzly and			Deer			Elk	Moose	Mountain Goat	Bighorn	Peccary		Wild Bear
		Black	Alaska	Brown	Whitetail	Mule	Blacktail							
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	
Alabama	..	10	..	3,000	..	..	..	..	..	..	..	..	3,000
Arizona	7,200	1,100	..	14,000	63,000	..	11,000	..	..	60	14,000	..	111,000
Arkansas	..	10	..	21,000	..	..	300	..	..	..	..	..	21,000
California	3,100	16,000	..	..	275,000	169,000	120	..	..	490	..	400	465,000
Colorado	200	7,500	10	..	221,000	..	31,000	..	10	3,600	..	..	263,000
Florida	..	260	..	9,500	..	..	..	..	..	..	..	..	9,600
Georgia	..	40	..	4,600	..	..	..	..	..	..	..	..	4,600
Idaho	7,800	9,100	45	23,000	140,000	..	46,000	1,800	4,000	2,300	..	..	234,000
Illinois	..	..	..	660	..	..	..	..	..	..	..	..	660
Indiana	..	..	..	1,500	..	..	..	..	..	..	..	..	1,500
Kentucky	..	10	..	400	..	..	..	..	..	..	..	..	410
Louisiana	..	..	..	1,700	..	..	..	..	..	..	..	..	1,700
Maine	..	20	..	500	..	..	..	5	..	..	..	..	520
Michigan	..	3,000	..	178,000	..	..	..	..	..	..	..	..	181,000
Minnesota	..	4,600	..	62,000	..	..	..	520	..	..	..	..	68,000
Mississippi	..	20	..	7,200	..	..	..	..	..	..	..	..	7,200
Missouri	..	5	..	21,000	..	..	..	..	..	..	..	..	21,000
Montana	2,700	7,400	560	41,000	128,000	..	34,000	4,000	4,100	1,100	..	..	222,000
Nebraska	..	..	..	10	450	..	..	..	..	..	..	..	460
Nevada	390	45	..	..	80,000	..	500	..	..	50	..	..	81,000
New Hampshire	..	340	..	1,900	..	..	..	10	..	..	..	..	2,200
New Mexico	1,900	1,500	5	6,100	52,000	..	2,300	..	..	140	600	..	64,000
North Carolina	..	870	..	11,000	..	..	..	..	..	..	..	300	12,000
Ohio	..	..	..	550	..	..	..	..	..	..	..	..	550
Oklahoma	..	..	..	400	..	..	..	..	..	..	..	..	400
Oregon	1,400	7,600	..	30	155,000	41,000	30,000	..	5	..	..	..	235,000
Pennsylvania	..	300	..	48,000	..	..	..	..	..	..	..	..	48,000
South Carolina	..	10	..	2,000	..	..	..	..	..	..	..	..	2,000
South Dakota	3,100	..	..	41,000	17,000	..	310	..	300	..	..	..	62,000
Tennessee	..	260	..	4,500	..	..	..	..	..	..	..	600	5,400
Texas	..	..	..	6,800	..	..	..	..	..	..	..	..	6,800
Utah	250	520	..	..	199,000	..	5,000	10	..	10	..	..	204,000
Vermont	..	420	..	10,000	..	..	..	..	..	..	..	..	10,000
Virginia	..	980	..	36,000	..	..	65	..	..	..	..	..	37,000
Washington	..	11,000	25	9,300	55,000	24,000	16,000	15	5,500	..	..	..	120,000
West Virginia	..	250	..	16,000	..	..	..	..	..	..	..	..	16,000
Wisconsin	..	1,400	..	68,000	..	..	..	..	..	..	..	..	70,000
Wyoming	1,300	2,400	90	6,000	52,000	..	36,000	2,900	..	1,900	..	..	103,000
TOTAL UNITED STATES	29,000	77,000	740	658,000	1,440,000	234,000	213,000	9,300	14,000	9,700	15,000	1,300	2,700,000	
Alaska	..	14,000	6,100	..	..	39,000	300	700	5,600	500	..	..	66,000
TOTAL ALL NATIONAL FORESTS	29,000	91,000	6,800	658,000	1,440,000	273,000	213,000	10,000	20,000	10,000	15,000	1,300	2,770,000	

* Totals have been rounded to nearest hundred or thousand.

Table 7 - NUMBER OF VISITS TO THE NATIONAL FORESTS FOR UTILIZATION OF THE RECREATION RESOURCES
CALENDAR YEAR 1952

State	Utilization of Recreation Resources									
	Utilization of Improved Public Recreation Areas				Organiza- tion Camps	Hotels or Resorts	Recrea- tion Resi- dences	Wilderness Areas	Other Forest Areas	Total
	Camp Grounds	Picnic Areas	Winter Sports Areas	Sub- total						
	Number Visits	Number Visits	Number Visits	Number Visits	Number Visits	Number Visits	Number Visits	Number Visits	Number Visits	Number Visits
Alabama . . . . .	..	36,390	..	36,390	2,900	..	..	..	41,600	80,890
Alaska	1,700	29,430	7,990	39,120	385	1,261	13,788	..	83,242	137,796
Arizona	161,671	458,030	7,995	627,696	15,605	84,885	11,689	19,831	492,905	1,252,611
Arkansas	45,200	201,325	..	246,525	18,650	8,700	3,500	..	131,950	409,325
California	1,271,079	695,449	619,902	2,586,430	202,753	238,647	268,730	158,641	1,400,877	4,856,078
Colorado	444,325	1,001,540	143,360	1,589,225	18,050	871,310	29,695	14,290	872,800	3,395,370
Florida	32,720	239,450	..	272,170	60,400	1,060	9,450	..	169,900	512,980
Georgia	30,200	253,900	..	284,100	2,200	..	1,500	..	212,400	500,200
Idaho	292,407	254,130	160,141	706,678	13,904	54,910	26,278	18,250	505,969	1,325,989
Illinois	300	122,700	..	123,000	..	..	..	..	150,830	273,830
Indiana	100	30,150	..	30,250	..	..	..	..	62,400	92,650
Kentucky . . . . .	..	20,610	..	20,610	350	..	1,100	..	73,000	95,060
Louisiana . . . . .	..	20,000	..	20,000	..	..	3,700	..	52,000	75,700
Maine	600	6,000	..	6,600	..	..	..	..	6,000	12,600
Michigan	40,674	99,920	81,500	222,094	10,550	2,000	2,220	..	704,750	941,614
Minnesota	45,735	60,712	17,960	124,407	3,291	42,625	13,920	57,000	411,000	652,243
Mississippi	3,300	62,775	..	66,075	..	..	..	..	148,100	214,175
Missouri	7,730	56,600	..	64,350	500	..	..	..	437,355	502,205
Montana	143,595	222,729	44,105	410,429	17,014	60,355	66,162	15,310	534,255	1,103,525
Nebraska . . . . .	..	32,200	..	32,200	..	..	..	..	3,000	35,200
Nevada	50,183	72,410	3,500	126,093	4,650	..	880	..	40,525	172,148
New Hampshire	34,450	85,660	42,000	162,110	..	130,000	..	100	258,265	550,475
New Mexico	99,295	522,275	27,610	649,180	11,334	1,900	4,290	6,315	659,091	1,332,110
North Carolina	158,340	515,830	..	674,190	3,762	68,400	720	35,500	656,270	1,438,842
Ohio	40,000	161,000	..	201,000	..	..	..	..	10,000	211,000
Oklahoma . . . . .	..	8,950	..	8,950	..	..	..	..	6,000	14,950
Oregon	512,375	479,194	227,900	1,219,469	24,780	531,765	35,547	15,220	449,243	2,276,024
Pennsylvania	5,000	90,000	..	95,000	2,000	10,000	9,000	..	769,000	885,000
Puerto Rico . . . . .	..	73,665	..	73,665	1,300	33,325	7,100	..	10,340	125,730
South Carolina . . . . .	..	194,936	..	194,936	..	..	..	..	83,600	278,536
South Dakota	54,710	345,800	100	400,610	8,050	5,300	13,500	..	941,000	1,368,460
Tennessee	18,220	231,100	..	249,320	11,650	21,100	21,840	..	897,300	1,201,210
Texas	11,900	94,100	..	106,000	2,200	..	..	..	70,700	178,900
Utah	375,355	1,647,020	164,785	2,187,160	55,510	65,812	45,090	14,455	615,175	2,983,202
Vermont	900	46,000	..	46,900	..	..	..	..	27,960	74,860
Virginia	8,011	216,160	..	224,171	2,030	..	345	..	234,370	460,916
Washington	474,200	478,335	166,050	1,118,605	43,694	123,411	52,017	7,942	297,395	1,643,064
West Virginia	10,024	136,801	..	146,815	2,325	..	..	..	162,405	311,545
Wisconsin	13,075	82,450	11,525	107,050	1,970	160	1,100	..	177,000	287,280
Wyoming	140,575	130,180	31,650	302,405	19,251	143,270	27,471	23,870	226,325	742,592
Totals	4,527,879	9,515,926	1,736,073	15,801,878	561,058	2,500,156	670,612	386,724	13,086,277	33,006,885

Notes: In addition to the 33,006,885 visits to national forest recreation areas, some 84 million traveled highways and roads through the national forests in order to enjoy the natural forest environment, the scenery, and the climatic relief which the altitudes and forest provide.

Table 8 - FIRES CONTROLLED BY NATIONAL FOREST FIRE ORGANIZATIONS TO
PROTECT THE NATIONAL FOREST LANDS

CALENDAR YEAR 1952, AND
5-YEAR AVERAGE, 1948-1952

Item	Number of fires		Percentage of Totals	
	1952	Average 1948-52	1952	Average 1948-52
Class of Burns:				
0.25 acres or less..	6,202	5,533	51.84	52.87
0.251 to 10 acres...	4,230	3,580	35.35	34.21
Over 10 acres.....	1,533	1,352	12.81	12.92
Total.....	11,965	10,465	100.00	100.00
Causes:				
Lightning.....	4,944	4,661	41.32	44.54
Man-caused:				
Smokers.....	2,391	1,893	19.98	18.09
Incendiarism.....	1,580	1,488	13.21	14.22
Debris burning.....	733	550	6.13	5.25
Campfire.....	844	630	7.05	6.02
Railroad.....	245	258	2.05	2.47
Lumbering.....	214	194	1.79	1.85
Miscellaneous.....	1,014	791	8.47	7.56
Total, man-caused..	7,021	5,804	58.68	55.46
Grand Total.....	11,965	10,465	100.00	100.00
Calendar Year				
		Total area of national forest land burned over	Total damage of national forest land burned over	
1952.....		Acres 138,544	Dollars 2,245,209	
5-year average 1948-1952.		261,850	5,023,901	

Table 9.-NET CASH RECEIPTS FROM NATIONAL FORESTS
FISCAL YEAR 1953

Net receipts from national forests:

		a
From timber	\$69,252,123.90	
From forage	4,415,862.17	
From special lands uses, water power, etc.	<u>1,064,481.48</u>	
Total		b.c. <u>\$74,732,467.55</u>

Distribution of above total:

1. Payments to Arizona and New Mexico, account school lands administered by Forest Service under acts June 20, 1910 (36 Stat. 562,573)	122,754.80	
2. Payment to State of Minnesota representing 3/4 of 1 percent of appraised value of national forest land in Cook, Lake and St. Louis Counties under Act of June 22, 1948 (62 Stat. 568).	45,332.20	
3. Payments to States in which national forests are located, under Acts of May 23, 1908 and March 1, 1911, as amended (16 U.S.C. 500)	18,649,793.93	d
4. Amount appropriated for expenditure by Forest Service for improvement of the range under section 12 of the Act of April 24, 1950	531,000.00	
5. Amount appropriated for expenditure by Forest Service for Roads and Trails, under Act of March 4, 1913 (16 U.S.C. 501).	7,460,971.28	
6. Net amount to United States Treasury.	<u>47,922,615.34</u>	
Total.		<u>\$74,732,467.55</u>

a

In addition to the cash receipts from timber, there should be credited the value of timber cut under specific agreements for effecting land exchanges, \$888,988.00.

b

This total exceeds the receipts for the previous year by \$5,012,269.96. Receipts from timber increased \$5,529,138.32; grazing decreased \$606,792.11; and miscellaneous increased \$89,923.75.

c

Additional receipts, from the sale of timber, are being held in suspense pending determination of the status of the lands from which such receipts were derived as follows:

Oregon and California Railroad Grant Lands	\$1,524,009.47
Tongass National Forest, Alaska	<u>207,268.91</u>
Total	\$1,731,278.38

d

Computed on the basis of total receipts after deduction of (a) 1 above and (b) \$10,537.03 collected in the counties of Cook, Lake, and St. Louis in the Superior National Forest, State of Minnesota to which the Act of May 23, 1908 does not apply.

Table 10. - PREVENTION AND SUPPRESSION EXPENDITURES FOR FOREST FIRE CONTROL
ON STATE AND PRIVATE FOREST LANDS, BY STATES
FISCAL YEAR 1953

(Clarke-McNary Law, Act of June 7, 1924)

STATE	EXPENDITURES			
	Federal Participation	State and County	Private Agencies	Total
	Dollars	Dollars	Dollars	Dollars
Alabama	326,051	561,654	118,115	1,005,820
Arkansas.	248,329	539,513	77,442	865,284
California.	1,420,579	5,796,407	--	7,216,986
Colorado.	25,100	49,562	32,041	106,703
Connecticut	44,509	114,744	--	159,253
Delaware.	8,200	11,057	--	19,257
Florida	532,929	936,856	158,573	1,628,358
Georgia	447,733	2,125,535	47,311	2,620,579
Hawaii.	4,500	8,299	--	12,799
Idaho	130,167	153,346	240,288	523,801
Illinois.	25,325	114,741	--	140,066
Indiana	50,492	117,617	--	168,109
Iowa	18,126	20,056	--	38,182
Kentucky.	87,353	329,124	--	416,477
Louisiana	298,291	896,253	7,623	1,202,167
Maine	233,141	1,094,818	--	1,327,959
Maryland.	108,807	359,449	--	468,256
Massachusetts	111,335	273,912	--	385,247
Michigan.	389,703	1,456,822	--	1,846,525
Minnesota	265,142	850,129	--	1,115,271
Mississippi	307,456	870,339	--	1,177,795
Missouri.	182,306	530,198	--	712,504
Montana	67,318	48,013	139,077	254,408
Nevada.	25,100	32,137	--	57,237
New Hampshire	60,463	213,939	7,609	282,011
New Jersey.	94,053	274,534	--	368,587
New Mexico.	14,843	15,040	--	29,883
New York.	248,607	894,716	--	1,143,323
North Carolina.	278,276	715,681	23,182	1,017,139
Ohio.	50,657	246,406	--	297,063
Oklahoma.	84,759	140,890	18,999	244,648
Oregon.	614,293	843,355	852,892	2,310,540
Pennsylvania.	195,926	592,034	--	787,960
Rhode Island.	25,100	118,945	--	144,045
South Carolina.	277,762	748,334	1,822	1,027,918
South Dakota.	25,100	42,299	3,834	71,233
Tennessee	163,021	578,502	2,952	744,475
Texas.	182,687	392,175	66,370	641,232
Utah.	25,100	57,916	--	83,016
Vermont	25,100	42,879	5,036	73,015
Virginia.	211,845	597,939	2,818	812,602
Washington.	562,503	1,274,060	503,986	2,340,549
West Virginia	141,801	365,327	--	507,128
Wisconsin	306,439	1,013,951	--	1,320,390
Totals.	8,946,327	26,459,503	2,309,970	37,715,800

Table 11. - DISTRIBUTION OF FOREST PLANTING STOCK
BY COOPERATING STATES. FISCAL YEAR 1953

(Clarke-McNary Law, June 7, 1924, as amended)

STATE	EXPENDITURES			
	Federal Funds	State Appropriated Funds	Receipts from Sale of Stock Used in Program	Total
	Dollars	Dollars	Dollars	Dollars
Alabama	11,500	65,817	71,359	148,676
Arkansas.	9,500	21,809	52,347	83,656
California.	9,500	30,873	7,651	48,024
Colorado.	2,780	2,780	10,750	16,310
Connecticut	7,350	10,073	20,385	37,808
Delaware.	2,500	8,023	-	10,523
Florida	11,500	108,313	105,358	225,171
Georgia	10,000	215,622	138,467	364,089
Hawaii.	9,500	13,696	-	23,196
Idaho	7,800	13,751	3,126	24,677
Illinois.	9,532	146,219	64,123	219,874
Indiana	9,532	59,918	101,665	171,115
Iowa.	9,531	18,017	5,985	33,533
Kentucky.	9,760	31,687	9,363	50,810
Louisiana	10,000	71,570	157,615	239,185
Maine	5,872	5,872	3,026	14,770
Maryland.	9,760	25,702	1,607	37,069
Massachusetts	9,760	38,339	12,731	60,830
Michigan.	9,531	21,146	42,900	73,577
Mississippi	10,000	21,249	88,333	119,582
Missouri.	9,532	30,009	7,658	47,199
Montana	8,514	8,514	21,742	38,770
Nebraska.	598	598	39,477	40,673
New Hampshire	9,760	13,766	5,855	29,381
New Jersey.	9,760	15,972	11,456	37,188
New York.	9,955	255,967	45,573	311,495
North Carolina.	11,500	71,360	35,593	118,453
North Dakota.	9,531	21,629	9,155	40,315
Ohio.	9,532	97,058	49,453	156,043
Oklahoma.	10,000	11,185	18,135	39,320
Oregon.	9,500	15,550	22,395	47,445
Pennsylvania.	9,935	118,494	109,530	237,959
Puerto Rico*.	9,800	13,563	-	23,363
Rhode Island.	2,500	2,720	1,395	6,615
South Carolina.	10,000	33,606	43,987	87,593
South Dakota.	5,922	5,923	58,267	70,112
Tennessee	10,000	13,488	11,360	34,848
Texas	10,000	18,572	29,447	58,019
Utah.	3,550	4,652	3,983	12,185
Vermont	9,760	20,426	7,128	37,314
Virginia.	9,760	76,792	42,159	128,711
Washington.	9,500	9,530	6,495	25,525
West Virginia	9,918	40,266	16,886	67,070
Wisconsin	9,532	238,682	31,633	279,847
Wyoming	2,518	2,518	5,108	10,144
Totals	386,085	2,071,316	1,530,661	3,988,062

*Estimated

Table 12. - COOPERATIVE FOREST MANAGEMENT ACCOMPLISHMENTS
AND EXPENDITURES 1/. FISCAL YEAR 1953

STATE	ACCOMPLISHMENTS				EXPENDITURES		
	Woodland Owners Assisted	Woodland Involved	Products Harvested	Gross Sale Value	Federal	State	Total
	Number	Acres	M bd. ft.	Dollars	Dollars	Dollars	Dollars
Alabama	724	93,305	20,981	604,774	21,240	21,495	42,735
Arkansas	111	17,582	673	13,005	3,592	3,592	7,184
California	645	132,666	34,346	332,143	8,293	37,759	46,052
Colorado	85	6,873	783	8,693	2,123	2,124	4,247
Connecticut	586	27,724	2,816	48,752	9,800	17,876	27,676
Delaware	6	260	10	200	1,200	1,272	2,472
Florida	1,469	748,066	36,451	618,118	22,508	41,759	64,267
Georgia	737	191,862	19,565	455,358	21,008	26,269	47,277
Idaho	34	7,982	38	1,140	2,500	2,580	5,080
Illinois	749	24,300	2,930	95,269	24,065	83,362	107,427
Indiana	985	42,203	5,744	186,144	12,552	49,798	62,350
Iowa	391	12,500	1,850	58,810	7,491	18,223	25,714
Kentucky	334	22,373	3,335	58,047	18,000	19,803	37,803
Louisiana	170	16,356	2,342	80,503	13,500	14,846	28,346
Maine	1,639	63,241	10,182	207,075	18,200	29,601	47,801
Maryland	1,871	34,506	12,561	280,524	18,000	46,070	64,070
Massachusetts	413	14,779	4,504	66,932	5,464	7,999	13,463
Michigan	755	14,657	8,588	247,776	19,973	42,638	62,611
Minnesota	518	15,888	4,304	145,417	9,378	22,725	32,103
Mississippi	393	82,720	4,540	93,695	13,783	14,813	28,596
Missouri	1,393	182,764	8,582	280,189	27,174	47,959	75,133
New Hampshire	1,199	50,703	20,065	417,471	18,350	21,805	40,155
New Jersey	538	70,151	5,474	97,133	13,099	34,030	47,129
New York	2,993	216,776	31,292	768,017	19,100	99,329	118,429
North Carolina	1,079	98,034	27,598	802,094	24,876	38,677	63,553
North Dakota	52	4,245	685	42,090	2,810	3,157	5,967
Ohio	1,286	49,716	6,394	186,034	12,445	66,794	79,239
Oklahoma	104	294	-	-	632	632	1,264
Oregon	647	29,732	30,657	746,902	8,478	20,772	29,250
Rhode Island	175	16,696	35	219	2,500	3,209	5,709
South Carolina	903	101,867	20,521	636,532	18,637	31,145	49,782
Tennessee	488	32,771	10,183	328,433	16,250	16,819	33,069
Texas	516	46,517	1,209	19,869	11,762	11,762	23,524
Vermont	3,002	77,432	26,283	662,916	28,600	54,661	83,261
Virginia	1,682	156,824	131,389	3,098,043	29,500	105,218	134,718
Washington	672	29,620	16,317	321,229	11,338	13,410	24,748
West Virginia	1,654	46,468	6,173	156,608	18,800	34,162	52,962
Wisconsin	1,476	47,256	8,019	423,389	23,513	68,018	91,531
Total U. S.	32,474	2,827,709	527,419	12,589,543	540,534	1,176,163	1,716,697

U. S. Summary

F.Y. 1940)					4,793	8,284	13,077
F.Y. 1941) <u>2/</u>	165	49,416	2,667	31,483	15,342	17,120	32,462
F.Y. 1942	224	92,442	10,076	125,307	18,171	19,579	37,750
F.Y. 1943	3,242	359,388	75,600	1,043,878	101,076	111,559	212,635
F.Y. 1944	8,842	742,697	323,557	3,962,784	187,316	212,209	399,525
F.Y. 1945	8,093	831,347	411,330	4,476,354	199,995	230,865	430,860
F.Y. 1946	12,083	1,321,746	452,367	6,092,499	315,441	369,065	684,506
F.Y. 1947	13,531	1,576,888	502,312	7,805,105	344,720	449,626	794,346
F.Y. 1948	14,220	1,399,971	503,641	7,668,499	353,179	467,129	820,308
F.Y. 1949	17,140	1,769,240	437,903	7,721,865	349,117	573,882	922,999
F.Y. 1950	22,828	2,542,564	518,566	9,421,220	538,812	726,973	1,265,785
F.Y. 1951	25,352	2,558,091	721,938	15,941,940	548,608	886,250	1,434,858
F.Y. 1952	27,933	2,501,317	609,562	13,924,940	537,160	985,902	1,523,062

1/ 262 Projects

2/ F.Y. 1940 and F.Y. 1941 Accomplishments Combined

Table 13. - FOREST FIRES ON PROTECTED STATE AND PRIVATE LANDS

NUMBER BY SIZE, AREA PROTECTED, AND AREA BURNED OVER

CALENDAR YEAR 1952

State	Number of Fires				Area Protected M Acres	Area Burned Over Acres
	Under 0.25 Acre Number	0.25 - 10.0 Acres Number	Over 10 Acres Number	Total Number		
Alabama	193	4,840	5,773	10,806	18,112	596,317
Arizona	Data Incomplete					
Arkansas	675	4,168	2,599	7,442	12,373	239,487
California	1,118	897	407	2,422	19,500	83,967
Colorado	92	131	39	262	7,472	8,564
Connecticut	141	584	76	801	1,907	4,408
Delaware	22	50	5	77	440	251
Florida	250	5,187	3,851	9,288	12,867	248,087
Georgia	2,271	4,247	2,772	9,290	16,504	217,956
Hawaii	1	1	1	3	1,735	6,003
Idaho	397	126	95	618	6,963	25,116
Illinois	95	456	993	1,544	3,755	231,469
Indiana	147	436	278	861	4,255	25,202
Iowa	12	38	34	84	1,968	5,548
Kentucky	7	534	2,176	2,717	5,773	736,205
Louisiana	230	6,220	4,424	10,874	9,564	394,392
Maine	397	454	97	948	16,692	24,695
Maryland	100	345	41	486	2,686	2,503
Massachusetts	441	815	91	1,347	3,293	8,559
Michigan	368	1,155	274	1,797	17,124	13,690
Minnesota	355	548	369	1,272	17,996	47,543
Mississippi	331	7,916	5,204	13,451	11,123	359,292
Missouri	338	2,274	1,659	4,271	7,532	161,174
Montana	216	58	15	289	6,000	1,665
Nebraska	Data Incomplete					
Nevada	19	16	8	43	2,150	1,342
New Hampshire	191	235	21	447	4,176	1,220
New Jersey	491	735	122	1,348	2,294	13,407
New Mexico	41	15	5	61	1,360	142
New York	260	1,213	477	1,950	13,423	32,573
North Carolina	176	1,644	1,994	3,814	15,553	298,805
North Dakota	Data Incomplete					
Ohio	271	749	353	1,373	4,973	28,762
Oklahoma	38	435	464	937	3,591	96,244
Oregon	720	304	111	1,135	11,995	21,893
Pennsylvania	55	789	688	1,532	14,659	67,894
Rhode Island	62	179	28	269	452	5,742
South Carolina	436	3,354	1,757	5,547	11,300	121,653
South Dakota	47	33	6	86	896	945
Tennessee	108	3,483	2,621	6,212	8,285	1,076,878
Texas	286	1,658	1,743	3,687	8,265	314,867
Utah	18	53	19	90	5,721	5,667
Vermont	40	101	19	160	3,504	902
Virginia	452	1,461	581	2,494	12,971	111,571
Washington	1,104	628	112	1,844	12,329	33,115
West Virginia	66	1,046	1,968	3,080	9,038	666,359
Wisconsin	565	650	89	1,304	15,590	5,153
Wyoming	Data Incomplete				533	
Totals	13,643	60,261	44,459	118,363	368,692	6,347,227

FISCAL YEAR 1953

(Classified by Primary Purpose of Appropriation)

National Forests:

Operation and Protection:

National Forest Protection and Management	\$29,237,467	
Fighting Forest Fires	5,634,609	
Blister Rust Control	1,724,029	
Forest Pest Control	2,024,727	
Cooperative Range Improvements	682,164	
Smoke Jumper Facilities	<u>582,883</u>	
		\$39,885,879

Forest Roads and Trails:

Forest Development, Roads and Trails.	13,763,439	
10% Fund for States	<u>10,769,077</u>	
		24,532,516

Acquisition of Land		<u>121,969</u>
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Total, National Forests \$64,540,364

Research:

Forest Research	5,385,990	
Research and Marketing Act	<u>29,918</u>	
Total, Research		5,415,908

State and Private Forest Land Items:

State and Private Forestry Cooperation		10,667,198
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Flood Control:

Preliminary Examinations and Surveys	312,303	
Works of Improvement	<u>995,259</u>	
Total, Flood Control		1,307,562

Services Performed for and Financed by Other Federal Agencies and Departments:

Production and Marketing Administration (Agriculture). . .	131,660	
Department of Interior	173,673	
Department of the Navy	240,366	
Department of the Army	1,365,508	
Air Force	354,154	
Department of Commerce	176,453	
Miscellaneous	<u>91,320</u>	
Total, Services for and Financed by Other Federal Agencies and Departments		2,533,134

Cooperative Work Financed by States, Counties, Organizations,
and Individuals. Includes fire control on intermingled
private land, construction and maintenance of improvements,
investigative work, slash disposal, etc.:

Cooperation Work Fund		6,662,332
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Expenses, Brush Disposal		<u>1,932,615</u>
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Total, Net Expenditures 93,059,113

Additional expenditures for which the appropriations were
reimbursed:

Forest Service Units and Other Government Agencies. . . .	5,746,547	
Non-Federal Agencies	<u>771,442</u>	
Total, Appropriation Reimbursements		<u>6,517,989</u>

Grand Total \$99,577,102

